

NOTES ON SAPINDACEAE IN AUSTRALIA, I.

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Summary

Sapindaceae in Australia consists of 30 genera with over 180 species. Most of the species are found in Queensland, mainly in the rainforests of northern Queensland. *Castanospora*, *Diplopeltis*, *Distichostemon*, *Heterodendrum*, and *Sarcotoechia* are endemic. Detailed descriptions of, and keys to, all taxa are given. The genera *Diploglottis* (8 species), *Atalaya* (9 species), *Jagera* (3 species) and *Harpullia* (8 species) are treated in this first paper of a series.

Taxa described as new are: *Diploglottis harpullioides*, *D. pedleyi*, *D. smithii*, *D. macrantha*, *Atalaya sericopetala*, *A. angustifolia*, *A. calcicola*, *A. rigida*, *Jagera discolor*, and *J. pseudorhus* var. *integerrima*. *Diploglottis cunninghamii* (Hook.) Benth. & Hook. is the correct name for *D. australis* Radlk.

The family comprises about 150 genera and 2000 species, the majority of them being trees or shrubs; only a few (5 genera and 300 species) are climbers. They are mostly found in the tropics and subtropics and are most common in America and Asia.

The Sapindaceae in Australia are trees or shrubs, only one, *Cardiospermum*, which is introduced and now naturalised, is a vine. Most of the Australian species are found in Queensland, mainly in the rainforests of northern Queensland where they are usually important species in the rainforest communities, some are found in dry scrubs, others along creek and river banks and a few along the coast.

The family in Australia consists of 30 genera and over 180 species, of which 4 genera viz. *Cossignia*, *Dictyoneura*, *Lepidopetalum* and *Tristiropsis* are newly recorded, being the extension of their range mainly from New Guinea. About 25 species are either new records or new species. Some of the genera e.g. *Castanospora*, *Diplopeltis*, *Distichostemon*, *Heterodendrum*, *Sarcotoechia* are endemic to Australia.

Bentham in 1863 (Fl. Aust. 1:451-488) listed 16 genera and 82 species as occurring in Australia. Radlkofer in his treatment of the family from 1878-1932 split some genera and described some new genera and species and recorded 25 genera and about 135 species for Australia. Various authors viz. C.T. White, Domin, etc. from 1920 to 1936 described ten new species which were not included in Radlkofer's work. Since then only five new species have been described.

No major revisionary work have been done on the family in Australia except A.S. George's paper on *Diplopeltis* (1969) and a few short papers on *Dodonaea* since Radlkofer. The late L.S. Smith was very interested in the family and was an authority on the Australian species. He collected notes and specimens over the years and made annotations and some sorting of the Queensland material but was unable to publish any material on the family before his untimely death in 1970.

There has always been some confusion in the identity of the Queensland species especially the rainforest ones, mainly because of the incomplete nature of the specimens and because a lot of the genera had at least a few undescribed taxa amongst the species. In some cases there was no representative specimen of a particular species and Radlkofer's regional keys on some genera did not help. Because of the revisionary work of some of the Botanists at Leiden, chiefly Dr. P.W. Leenhouts on different groups of the family some with Australian representatives, a few of the genera occurring here have been straightened out. The need for the review of the family here became necessary when the family had to be written up for the Handbook to the Flora of South-eastern Queensland as a third of the species occur in the area. A lot of sorting and some collecting had to be done and some doubtful species checked against their types.

It was found that in some cases e.g. in *Arytera*, some of the confusion originated from the days of Mueller, Bentham and Radlkofer. In one case the type was a mixed collection and in the other the holotype held at Melbourne was different from the isotype distributed to Kew.

All the genera (except *Diplopeltis*) that occur here have been checked and studied and the review of all (except *Dodonaea* on which a separate revision is being carried out in Adelaide) will be published in parts. Although about 20 new species are to be described a lot more are still imperfectly known.

Many of the Sapindaceae are of economic value; several contain saponin in bark, twigs, leaves and pericarp; some yield valuable timber and others furnish edible fruits, the best known being *Dimocarpus longan* spp. *longan* "Longan", *Litchi chinensis* "Lychee" and *Nephelium lappaceum* "Rambutan", both "Lychee" and "Longan" are now cultivated in Australia.

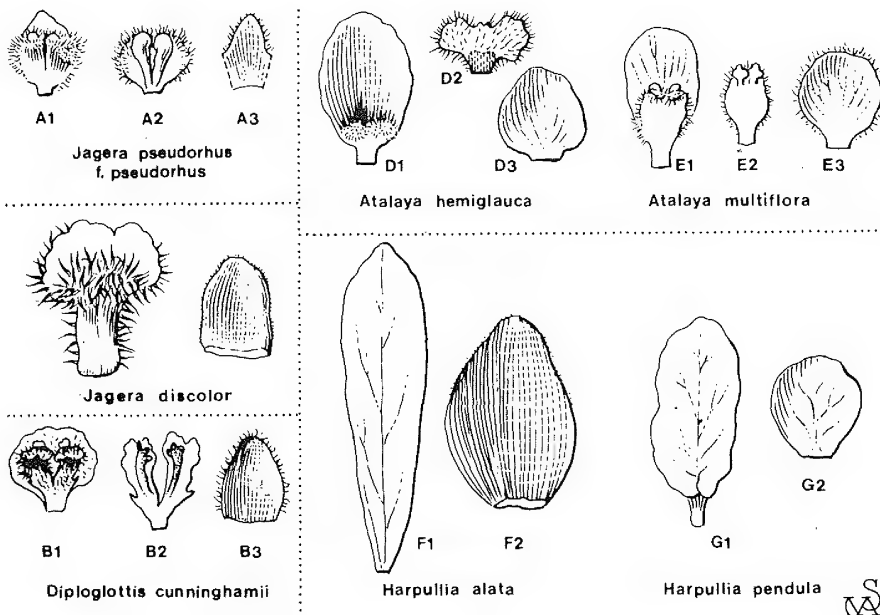


Figure 25. Flowers of some Sapindaceae. Petals, sepals and scales.

DIPLOGLOTTIS

Diploglottis Hook.f., Benth. & Hook.f., Gen. Pl. 1:395 (1862). **Type species:** *D. cunninghamii* (Hook.) Hook.f., based on *Cupania cunninghamii* Hook.

Trees usually monoecious, most species with large fluted rusty hairy branchlets and large leaves, rarely glabrous. Leaves paripinnate, often with large opposite to alternate entire leaflets. Inflorescences axillary, or pseudoterminal and forming large copiously flowered thyriform panicles; primary peduncles either stout ribbed and densely rusty hairy or pale hairy; cymules often sessile; bracteate. Flowers polygamous, regular or slightly irregular; pedicellate; calyces shortly cupular with 5 ovate lobes, or sepals free, broadly ovate, suborbicular or obovate and unequal, imbricate, often concave; petals 4 or 5, the fifth one often reduced, clawed, with bilobed hairy and usually crested scales, reduced petal often crestless; discs complete or incomplete, often oblique; stamens 6–9, filaments exerted, pilose in lower half; ovaries trigonous, usually hairy, style stout. Capsules usually large, transversely ellipsoid to irregularly globose, 2 or 3–sulcate with 2 or 3 globose lobes, or 1–lobed with aborted lobes usually small and reduced; usually completely 2 or 3–celled; 2 or 3–valved; valves thin or thick, usually hairy; seeds large, suborbicular slightly compressed, ascendent, nearly enclosed in thick, fleshy, acidic, usually bilobed, erose-margined aril.

Australia and probably also in New Guinea; eight species (four new) in eastern Australia.

1. Leaves with 1–3(–4) pairs of opposite or subopposite leaflets, usually glabrous; petioles and rachises glabrous or puberulent. Sepals obovate or suborbicular, unequal. Disc complete or incomplete with erect lateral lobe enclosing the stamens on one side 2
 Leaves with (2–)4–12 alternate or subopposite leaflets on each side of rachis, usually hairy especially on nerves on lower surfaces; petioles and rachises densely hairy to puberulent. Sepals usually ovate, rarely orbicular, equal or unequal. Disc complete or incomplete (then discs often crescent shaped and not enclosing the stamens) 3
2. Panicles 12–16 cm long and as wide. Capsules subglobose 3.5–7 cm long and in diam., rarely smaller, 2 or 3–valved with thin valves. Leaves with petiole (15–)24–33 cm long, glabrous or subglabrous; petiolules 2–5 mm long. Disc incomplete with erect lateral lobe enclosing the stamens on one side. 1. *D. campbellii*
 Panicles small and few flowered, 1–2.5 cm long and as wide. Capsules transversely ellipsoid mostly 2-lobed with subglobose unequal lobes, 3–4 x 3–6.2 cm, 2–valved with thick valves. Leaves with petiole 22–58 cm long, glabrous; petiolules 1–3.5 cm long. Disc usually complete, oblique 2. *D. harpullioides*
3. Younger parts especially young leaves, petioles, rachises, petiolules and nerves densely rubiginose or dark reddish brown hairy with villous hairs. Capsules with glabrous valves usually 1 (or 2)–lobed with reduced aborted lobes at its base, subglobose or ellipsoid, oblique, 1-celled, 2-valved. Sepals orbicular; petals usually with thin crests. Pinnae 11–19(–23) in number 3. *D. pedleyi*
 Younger parts, young leaves, petioles, rachises, petiolules and nerves not dark reddish brown hairy as above, hairs either ferruginous or very pale. Capsules with valves hairy at least inside, irregularly globose to transversely ellipsoid; 3-celled with 3 thick valves, or (1–)2 or 3–sulcate or –lobed, lobes subglobose, 1–celled, 2–valved with thin valves. Sepals ovate; petals crested except some reduced ones. Pinnae 6–10(–18) in number 4
4. Panicles conspicuously bracteate with sessile or subsessile cymules in axil of bracts, usually scurfy and pale hairy. Bracts 4–35 x 3–6 mm, pale hairy. Branchlets, petioles, rachises and peduncles usually pubescent or puberulent with pale short appressed hairs often intermingled with long rusty hairs. Leaflets 8–14 in number. Branchlets slender 5
 Panicles not as above, usually rusty hairy; bracts to 7 x 3 mm, rusty brown hairy outside. Branchlets, petioles, rachises and peduncles usually densely rusty villous hairy. Leaflets 4–10(–18), usually large. Branchlets mostly stout and fluted 6
5. Pinnae with numerous lateral nerves, 24–34 pairs, 3–7 mm apart, often with secondary nerves between them, usually depressed above, bullate. Peduncles densely hairy with somewhat crispate hairs intermingled with long rusty hairs; bracts to 8 x 3 mm, ovate acuminate. Capsules 1.4–1.8 x 2–3.5 cm, transversely ellipsoid or subglobose 1–3 celled; valves 2 or 3, thin 4. *D. smithii*
 Pinnae with 11–23 pairs of lateral nerves, 6–15 mm apart, not bullate. Peduncles globose at base, pubescent with short pale appressed hairs; bracts to 35 x 6 mm, oblong ovate, acuminate,

- grooved in the middle. Capsules 2.8–3.6 x 2.8–4.5 cm, subglobose 3-celled; valves 3, thick, rindlike, drying sub-woody 5. *D. bracteata*
6. Petioles 0.7–3.5 cm long. Panicles slender, not divaricately branched, 6.5–13 cm long and to 3 cm wide. Flowers 7–8 mm diam. Leaflets 6–10, mostly ovate-oblong or oblong, acuminate-apiculate at tips. Shrubs or small slender, unbranched trees 2–4 m. 6. *D. macrantha*
- Petioles 0.2–1.5 cm long. Panicles divaricately branched, 12–50 cm long and nearly as wide; primary peduncles usually stout and fluted. Flowers 4–6 mm diam. Leaflets 4–18, usually oblong or elliptic-oblong, often wider above the middle, tips broad, rounded or abruptly and shortly acuminate. Trees (6–)10–30 m tall, branching at the top 7
7. Leaflets usually oblong with broad, truncate or obtuse bases, unequal and cut to about second last pair of lateral nerves, and broad, rounded apices, 9–51 x 5–18 cm; petiolules 2–15 mm long. (Leaf with petiole (28–) 45.5–130 cm long with 3–5(–8) leaflets each side of rachis. Branchlets and primary peduncles stout and fluted) 7. *D. cunninghamii*
- Leaflets usually elliptic-oblong or subobovate-elliptic, often broader above the middle, acute, obtuse and oblique at base and rounded or abruptly and shortly acuminate at apices, 4.5–23 x 2–9.5 cm; petiolules 2–6 mm long. (Leaf with petiole (14–)38–70 cm long with (2–) 3–9 leaflets each side of rachis. Branchlets and primary peduncles usually slender) 8. *D. diphylostegia*

1. *Diploglottis campbellii* Cheel, Proc. Linn. Soc. N.S.W. 48: 685 (1923); Francis, Aust. Rain-For. Trees, ed 3:256 (1970). **Syntypes:** Tintenbar, Feb 1892, *M. Bauerlen* (not seen); Tweed River, *R.A. Campbell* (not seen).

Trees 8–20 m, young parts sericeous hairy; branchlets, petioles and rachises puberulent with pale short usually antrorse hairs intermingled with long hairs, lenticels small, broadly elliptic. Leaves with petiole (15–)24–33 cm long with (1–)2–4 pairs of leaflets; petioles semiterete, 3.5–7 cm, pulvinate; rachises adaxially ridged, 2–10 cm; pinnae usually opposite and decreasing in size from apex to base, elliptic-oblong or –subobovate or –ovate, acute or abruptly and shortly acuminate at apices, subacute or obtuse, oblique or unequal at base with one side decurrent into petiolules, 7–19 x 2.5–7 cm, glabrous or lower surfaces subglabrous, puberulent on midribs, semicoriaceous, lateral nerves 10–14 pairs, subpatent; petiolules semiterete, 2–5 mm, pulvinate. Thyrsiform panicles axillary or supra-axillary, laxly branched and flowered, 12–16 cm long and as wide, peduncles tomentose or pubescent. Flowers to 5 mm diam.; pedicels to 3 mm, pubescent; calyces 5–partite, lobes imbricate, obovate or suborbicular, concave, 2.5–4 x 2–3 mm, pubescent; petals 4 or 5, subspathulate, rounded at apex, long clawed with tubular claw, 2–2.5 x 2 mm, scales bilobed longer than lamina, villous, crests yellowish; disc incomplete with oblong erect lateral lobe enclosing the stamens on one side; stamens 8 or 9, curved and inflexed towards the erect lobe of disc, filaments 3–4 mm, glabrous, ovaries 3-celled, pubescent. Capsules subglobose or depressed ovoid, obscurely 3-sulcate, 3.5–7 x 3.5–7 cm, rarely small and globose to 2 x 2 cm, brownish and thinly hairy; seeds subglobose often enclosed in fleshy, acidic, bilobed red aril.

Restricted to southern Queensland and northern New South Wales from Tintenbar, Richmond River to Tallebudgera Creek area, not common.

Queensland. MORETON DISTRICT: Tallebudgera Creek, Dec 1917, *White & Young* s.n. **New South Wales.** Byron Bay, Feb 1975, *Willows* s.n.; Road up to Mt Warning approx. 1 km past the creek crossing, Apr 1979, *Jessup* 196.

2. *Diploglottis harpullioides* S.T. Reynolds species nova; a speciebus ceteris Australianis foliis glabris et perbrevisibus inflorescentibus differt. **Typus:** Cook District: Harvey Creek, 12 October 1973, *L.J. Webb & J.G. Tracey* s.n. (BRI, holotypus).

Small trees 3–5 m, branchlets puberulent or glabrescent with minute, appressed pale hairs, lenticellate, striated. Leaves with petiole 22–58 cm long, with (1–)2–4 pairs of leaflets, (leaves decreasing in size from apex to base); petioles 5.5–14 cm, subterete, shortly pulvinate and globose at base, glabrous; rachises 3.5–27 cm, subterete, glabrous; pinnae opposite, elliptic-oblong or subovate-elliptic-oblong or subobovate-elliptic, abruptly acuminate at apices, acute and very oblique at base, 8–23.5(–31.5) x 3.5–8(–10.5) cm, glabrous, coriaceous, lateral nerves 9–14 pairs,

subpatent, arched and ascending and anastomosing near margins, prominent, midribs raised, reticulations lax; petiolules 1–3.5 cm, slender, subterete, slightly channelled above pulvinate base, puberulent. Panicles small, axillary, usually on short lateral branchlets in axil of fallen leaves, 1–2.5 cm long and nearly as wide, usually branching from the base, cymules 2 or 3-flowered; peduncles pubescent; bracts minute. Buds globose; flowers to 5 mm diam.; pedicels 5–7 mm, articulate towards base, densely appressed hairy; sepals imbricate, broadly ovate or orbicular, concave, 4 x 3.5–5 mm, unequal, outer pair smaller, ciliolate, appressed pubescent outside, glabrous inside; petals 5, broadly ovate-orbicular, shortly clawed, membranous, delicately veined, 2–5.5 x 2.5–5.5 mm, glabrous outside, puberulent inside towards the claw and scales, scales bilobed with thin crests; disc glabrous, repand and often fleshy and suboblique; filaments 2–4 mm long, pilose; ovaries 3-celled, villous, style short. Capsules transversely ellipsoid usually 2-lobed with \pm orbicular lobes, or 1-lobed and subglobose, with aborted lobes towards base 3–4 x 3.5–6.2 cm, 2-valved, valves thick (to 4 mm thick) appressed pubescent inside; seeds orbicular, slightly compressed, enclosed in fleshy bilobed red aril.

Northern Queensland, from Cedar Bay, near Bloomfield River to around Babinda, in rainforests.

COOK DISTRICT: Cedar Bay, near Bloomfield R, Feb 1973, *Dick* s.n.; Weinert's Ck, Babinda (17°20'S, 145°55'E), Nov 1977, *Jago* 272 (QRS).

This species differs from the rest of Australian species in the glabrous leaves and very short inflorescences.

3. *Diploglottis pedleyi* S.T. Reynolds species nova; a speciebus ceteris Australianis ramulis petiolalis rhachidibus et pedunculis omnibus dense atrorufescenter villosis et foliis pluribus, 5–12—jugis differt. **Typus:** Cook District: The Boulders, Babinda Creek, ca 6 km W of Babinda, 31 Aug 1954, *L.S. Smith* 5336 (BRI, holotypus).

Small trees, 7–9 m, often multistemmed, young parts especially young leaves densely red-rusty villous hairy and furry; branchlets ribbed, stout, villous hairy. Leaves with petioles 56–64.5(–82) cm long, with 5–10(–12) leaflets each side of rachis; petioles 10.5–19(–24.5) cm, semiterete, flattened above at broad pulvinate base; rachises 16.5–36.3(–59.5) cm, terete, bi- or trisulcate; pinnae opposite or subopposite, narrowly elliptic-oblong, tips abruptly and shortly acuminate, bases obtuse, truncate, oblique, 10–28(–33.5) x 3.4–5.7(–6.5) cm, glabrous or the midribs puberulent, semicoriaceous, lateral nerves 18–25 pairs, arcuate, raised below and often impressed above; petiolules 0.8–2 cm, slender, pulvinate. Panicles axillary, usually clustered at tips of branchlets, 6–10 x 1.5–11 cm, laxly branched with spiciform branches bearing clusters of usually 3-flowered sessile cymules; bracts 3 x 1.5 mm, ovate, concave, rusty hairy outside, glabrous inside. Buds globose; flowers (hermaphrodites) to 11 mm diam., cream; sessile; sepals imbricate, outer pair smaller, 3.5–4 x 4 mm, orbicular, concave, glabrous or rarely puberulent outside, ciliolate on pale margins, glandular dotted; petals 5, none reduced, broadly ovate, clawed, 3–4 x 2.5 mm, glabrous except claw, scales bilobed with crest-like appendages or crests thin, scales hairy on margins; disc 5-lobed or crenate, fleshy, glabrous; filaments to 1.5 mm long, pilose, anthers oblong-ovoid to 2.5 mm, pilose at sutures; ovaries puberulent, 3-celled. Capsule subglobose or transversely ellipsoid, oblique, usually 1(–2)-lobed with reduced aborted lobes often present near its base, sessile, 3.5–5.5 x 4.5–7.5 cm, glabrous; 2-valved, valves coriaceous, glabrous inside; seeds suborbicular, oblique, slightly compressed, 3–4 x 3.5–4 cm, nearly enveloped by fleshy (5–8 mm thick) bilobed red aril.

Northern Queensland, chiefly coastal in the Babinda-Innisfail area, in rainforests.

COOK DISTRICT: The Boulders, Babinda, 30 Aug 1949, *Krause* 3; S.F.R. 755, Barong L.A., (17°31'S, 146°30'E), 13 Sep 1972, *Dansie* s.n. (QRS 22791-22796); 9 Sep 1976, *Fitzsimon* 56 (QRS); 28 Oct 1976, *Hyland* 9157; McNamee Ck near Palmerston National Park, 31 Oct 1968, *Webb & Tracey* 8322.

This species differs from the rest of Australian species in the dense deep rusty red villous hairy branchlets, petioles, rachises, petiolules and peduncles. The leaflets are also more numerous, being 5–12 paired, and the large fruit is glabrous.

It is named in honour of Mr. L. Pedley who is very interested in the genus and has helped sort out the many problems, especially the nomenclature, of the family in Australia.

4. *Diploglottis smithii* S.T. Reynolds sp. nov. Species haec a ceteris differt nervis lateralibus numerosis (24–28–jugis) approximatis inter se 3–7 distantibus patentibus impressis supra. Inflorescentiae et bracteacis *D. bracteatae* similes. **Typus:** Cook District : Paronella Park, Muna Creek near Innisfail, Aug 1948, *L.S. Smith* s.n. (BRI, holotypus).

Trees 7–15 m tall and 22–60 cm girth, buttressed; young parts especially young leaves furry or densely rusty villous hairy; branchlets ribbed, lenticellate, densely appressed hairy with short pale appressed hairs intermingled with longer rusty hairs. Leaves with petiole 29–47 cm long, with 4–6 leaflets each side of rachis; petioles 6.5–12 cm, semiterete, slightly margined, pulvinate, often lenticellate, puberulent; rachises 10.5–28 cm, often bisulcate above, lenticellate, pubescent or puberulent; pinnae alternate or opposite, lowermost pair the smallest, elliptic or elliptic-oblong often abruptly narrowing at both ends, or obovate-elliptic, acute, obtuse or abruptly and shortly acuminate at apices with emarginate acumen, bases obtuse or acute and shortly decurrent, oblique and subequal, (6–)9–19.5(–26) x 2.5–7(–11.5) cm (juvenile leaves simple, to 38 x 11.5 cm), glabrous and shiny above, puberulent especially on nerves or glabrous below, minutely papillose on lower surfaces, semi-coriaceous, lateral nerves 24–34 pairs, close to each other, 3–7(–10) mm apart, often with secondary nerves between them, subpatent, arched and ascending at tips, nerves depressed above, bullate, reticulation dense; petiolules 0.5–1.4 cm, grooved above, pulvinate, puberulent. Thyrsiform panicles supra-axillary or pseudoterminal, laxly branched, 13–32 x 13–27 cm, peduncles densely minutely hairy with somewhat crispate tomentum intermingled with longer straight rusty hairs, ribbed, bearing sessile 4–7-flowered cymules in axil of bracts; bracts narrowly oblong-ovate, 5–8 x 2–3 mm, crispate tomentose outside, glabrous towards the base inside, deciduous. Flowers (females) about 5 mm diam.; pedicels to 3 mm long, articulate about middle, pubescent; calyces 5-lobed, lobes subequal, ovate, 2.5–3 x 2 mm, crispate tomentose outside, pubescent inside except glabrous base; petals 5, one usually reduced, broadly suborbicular, long-clawed, or spatulate, glabrous except crispate hairy scales, 3.5 x 2.5 mm, scales bilobed, crested; disc almost complete, rarely oblique, crenate, glabrous; filaments subulate 2 mm long, pilose towards base; ovaries subglobose, tomentose, style stout, 2–3 mm long, glabrous. Capsules transversely ellipsoid or subglobose, 1.4–1.8 x 2–3.5 cm, ± obscurely 2 or 3 sulcate, usually with pale or whitish bloom; valves thin, finely pale greyish or whitish pubescent outside, puberulent inside with appressed scattered hairs; seeds brown enclosed in red juicy acidulous aril.

Northern Queensland from Bloomfield River to Innisfail area where it is quite common in rainforests.

COOK DISTRICT: Gap Creek about 38 km S by E of Cooktown, Aug 1959, *Smith* 10739; Daintree, *Rosenstrom* s.n.; National Park Reserve 904 (17°35'S, 145°45'E), Oct 1968, *Hyland* 2025; The Boulders near Babinda in 1956, *Wilkie* s.n.

The species differs from the rest in having numerous lateral nerves (24–28 pairs), close to each other, 3–7 mm apart, patent, impressed above. Inflorescence and bracts similar to *D. bracteata*.

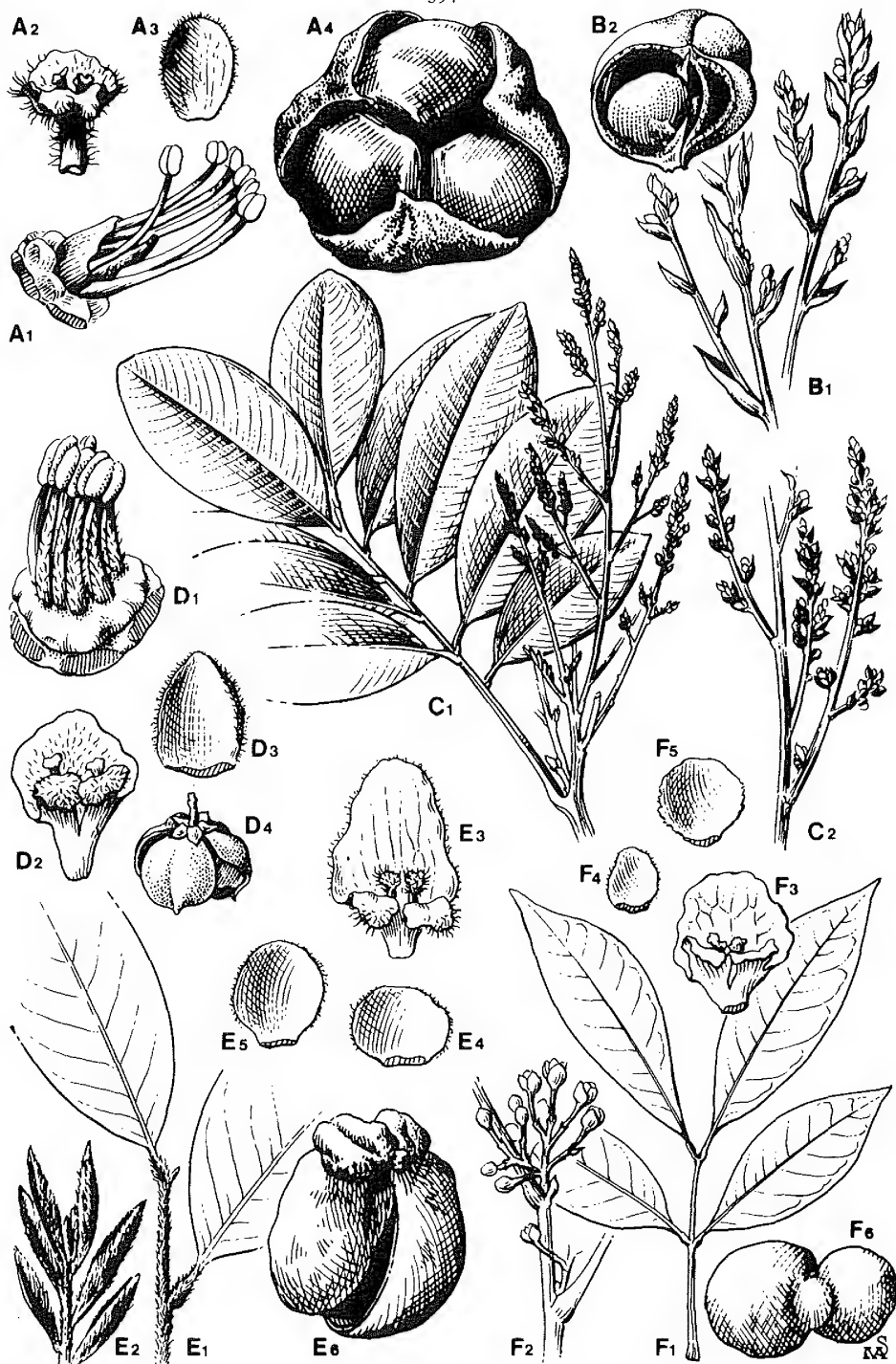


Figure 26. *Diploglottis*. A. *D. cambellii*. A1. Flowers, sepals and petals removed (x 8). A2. Petal (x 8). A3. Sepal (x 4). A4. Fruit (x 2/3). B. *D. bracteata*. B1. Portion of inflorescence (x 2/3). B2. Fruit (x 2/3). C. *D. smithii*. C1. Leaf. C2. Portion of inflorescence (x 2/3). D. *D. macrantha*. D1. Flower, sepals and petals removed (x 6). D2. Petal (x 6). D3. Sepal (x 6). D4. Fruit (x 2/3). E. *D. pedleyi*. E1. Portion of leaflet (x 1). E2. Young leaflets (x 2/3). E3. Petal (x 6). E4 & 5. Outer and inner sepals (x 6). E6. Fruit (x 1/2). F. *D. harpullioides*. F1. Leaf. F2. Portion of inflorescence. F3. Petal (x 6). F4 & 5. Outer & inner sepals (x 6). F6. Fruit (x 1/2).

It is named after the late Mr. L.S. Smith who was an authority on Australian Sapindaceae.

5. *Diploglottis bracteata* Leenh., *Blumea* 24 (1) : 176 (1978). **Type:** Cook District: Gadgarra and Ghurka Pocket, *L.S. Smith* 1057. (BRI, iso).

Small trees to 10 m, and 25 cm girth, young parts, branchlets, petioles, rachises, petiolules and peduncles with appressed short pale pubescence; branches 5-ribbed, lenticellate. Leaves with petiole (19-) 30-57 cm long, with 4-7 leaflets each side of rachis; petioles 3.5-9 cm, semiterete, slightly margined, flat above at broad, pulvinate base; rachises 6-24 cm, flattened and slightly margined above; pinnae alternate or subopposite, elliptic oblong, tips obtuse or shortly abruptly acuminate with emarginate acumen, bases acute, attenuating and shortly decurrent into petiolules, 5.5-23 x 2-6.5 cm, glabrous above or midribs hairy, puberulent, often scurfy and papillose below, semicoriaceous, lateral nerves 11-23 pairs, subarcuate; petiolules 0.8-1.8 cm, grooved above. Thyrsiform panicles axillary or pseudoterminial, often divaricately branched, 15-31 x 13-26 cm; peduncles ribbed, globose at base; bracts mostly oblong ovate, 0.8-3.5 x 0.4-0.7 cm, hoary pubescent and scurfy outside, puberulent to glabrescent inside. Flowers in 3 or 4-flowered sessile cymules, 4.5-6 mm diam., males smaller; pedicels 4-11 mm, articulate below middle, tomentose; calyx lobes broadly ovate, imbricate, crispate hairy except glabrous base; petals 5, none reduced, broadly obovate, shortly clawed, 3-3.5 x 2-2.5 mm, glabrous or puberulent only towards base outside, scales bilobed, obovate, nearly as long as petals, crispate hairy, crests stipitate; disc annular, fleshy, glabrous; stamens 7-8, filaments subulate, 3-4 mm long, pilose from middle to base; ovaries subglobose, tomentose, style 3 mm long, pilose to subglabrous. Capsules subglobose 2.8-3.6 x 2.8-4.5 cm, \pm 3-gonous, 3-celled, valves coriaceous, thick (to 4 mm thick), rind-like, wrinkled, (somewhat woody when dry) finely and minutely tomentose outside, villous inside with appressed hairs; seeds globose embedded in bilobed aril.

Northern Queensland, around Atherton Tableland, in rainforest remnants usually at high altitudes.

COOK DISTRICT: Forest Reserve 310, Gadgarra, Aug 1964, *Volck* 3464; Butchers Creek Rd about 8 km E of Malanda, Nov 1969, *Volck* 4399; Portion 12, Parish of Malanda (17°18'S, 145°39'E), Sep 1977, *Gray* 677 (BRI, QRS).

6. *Diploglottis macrantha* L.S. Smith ex S.T. Reynolds sp. nov. Species nova *D. cunninghamii* proxima a qua imprimis floribus majoribus (circa 8 mm diametro) habitu (statura minore 2-4 m) foliis apicem acuminatis et longipetiululatis differt. **Typus:** Cook District: Iron Range, 27 Jul 1949, *H. Flecker* 13158 (BRI, holotypus).

Shrubs or small trees 2-4m, unbranched; young parts especially young leaves densely velutinous hairy with dark brown hairs; branchlets stout, fluted, densely ferruginous hairy, so also are petioles, rachises, petiolules and peduncles. Leaves large, with petiole 36-47(-86) cm long, with 3-5 large leaflets each side of rachis; petioles 15.5-17.5(-27) cm, terete trisulcate, broad at base; rachises terete ribbed, 21-34(-45.5) cm; pinnae subopposite or alternate, usually oblong ovate narrowing towards acuminate apex, or elliptic oblong, apices usually abruptly and shortly acuminate and apiculate, bases unequal, broadly obtuse or somewhat rounded or truncate, (8.5-)14-22(-27) x (4-)7-8.5(-13) cm, puberulent above, pubescent or puberulent below with the midribs and nerves densely rusty hairy, usually pellucid dotted below, upper surfaces drying paler and duller, semicoriaceous, lateral nerves 13-30 pairs, suboblique, arched and ascending at tips, slightly impressed above, bulate and often transversely corrugate between the nerves, reticulations lax; petiolules 0.7-3.5 cm with the basal leaflets on longer stalks, broad at base. Thyrsiform pani-

cles axillary, slender, 6.5–13 cm long and to 3 cm wide, with dense cluster of cymules, peduncles ribbed, lined by short decurrent flower-bearing branches; bracts ovate-oblong 4–6 x 2–3 mm, rusty velvety tomentose outside, subglabrous especially towards base inside. Flowers cream, 7–8 mm diam., males smaller; pedicels 6–8 mm, articulate about middle, tomentose; calyx lobes 5, ovate, 3–5 x 2.5–3.5 mm, often carinate towards apex, yellow-brown crispate tomentose; petals 5 (one often reduced and crestless), suborbicular and long clawed or spatulate, 4–5 x 2.5–3 mm, hoary towards base and claw outside, densely hairy on scales and claw inside, scales as long as petals, bilobed, crested; disc glabrous, complete or nearly so, suboblique, often crenate on one side; stamens 8–10, filaments subulate, 4–5 mm, pubescent from middle to base, anthers broadly ovate, to 1 x 1 mm; ovaries trigonous, globose, villous, style 5 mm long, pilose. Capsules very broadly obovoid or obcordate, apiculate, 1.5–2 x 2–4 cm, 3 or 2-sulcate, golden rusty velutinous tomentose outside, valves semicoriaceous, pilose pubescent inside with appressed hairs; seeds subellipsoid, brown, nearly covered by orange-red aril.

Northern Queensland, Cape York Peninsula (from Bamaga to Iron Range and along McIlwraith Range). Scattered in gallery rainforests or dry monsoon forests, usually on stony soil, on hills and beside creeks.

COOK DISTRICT: Bamaga Mission, Oct 1965, *Smith* 12411; Tozer Gap, Tozer Range, Jul 1910, *Brass* 19520; Mt. Tozer flank (12°45'S, 143°10'E), Jun 1972, *Irvine* 229; Kennedy Road, W. Claudie River (12°45'S, 143°15'E), Aug 1965, *Gittins* 1041; Leo Creek (13°40'S, 143°20'E), Sep 1972, *Hyland* 6386; T.R. 14 Rocky River, (13°50'S 143°25'E), Sep 1973, *Hyland* 6798.

The species is closest to *D. cunninghamii* but differs chiefly in large flowers (about 8 mm diameter), habit (smaller stature 2–4 m), leaflets with acuminate tips and long petiolulate.

7. **Diploglottis cunninghamii** (Hook.) Hook.f. in Benth. & Hook., *Gen. Pl.* 1:395 (1862); Benth., *Fl. Aust.* 1:454 (1863); F.M. Bailey, *Qd Fl.* 1:287 (1899); Domin, *Biblioth. Bot.* 89:905 (1927). Based on *Cupania cunninghamii* Hook., *Curtis Bot. Mag.* 75,t.4470 (1849). **Type:** Cultivated specimen at Kew (not seen).

Stadtmannia australis Cunn. mss., *Curt. Bot. Mag.* 75,t.4470 (1849), *pro syn. Diploglottis australis* Radlk., *Sitzungsber. bayer. Akad.* 9:486, 499, 531 (1879). Based on *Stadtmannia australis* Cunn. mss. non G. Don “*Diploglottis australis* (G. Don) Radlk.”; R.H. Anders., *Trees of N.S.W.* ed. 3:254 (1957); Beadle, Evans and Carolin, *Handb. Vasc. Plants Sydney Dist.* ed. 1. 324 (1962); Francis, *Aust. Rain-For. Trees* ed. 3:252 (1970).

Misapplied name: *Stadtmannia australis* G. Don, *Gen. Syst.* 1:669 (1831).

Trees 6–35 m, branching at top; young parts especially young leaves rusty velutinous tomentose; branchlets stout, fluted, densely rusty villous hairy with spreading hairs; petioles, rachises, petiolules and peduncles also rusty tomentose. Leaves large, with petiole (28–) 45.5–130 cm long, with 3–5(–8) large leaflets each side of rachis; petioles 8–11(–17) cm, terete, trisulcate, broad at base; rachises 11–35(–71) cm, terete, trisulcate; pinnae subopposite or alternate, oblong or elliptic-oblong, rarely oblong-ovate or often basal pair obovate, tips broad, rounded, obtuse or rarely abruptly acuminate, margins repand, bases usually broad and truncate, oblique unequal and usually cut on one side to about second last pair of lateral nerves, rarely obtuse, 9–33(–51) x 5–12(–18) cm, (juvenile leaves often simple, obovate-oblong, to 29 x 12 cm), upper surfaces usually glabrous except rusty midribs, lower ones pubescent to puberulent often pellucid dotted, semicoriaceous, lateral nerves 19–28 pairs, suboblique, parallel, bullate between nerves and transversely corrugate; petiolules 0.2–1.5 cm, semiterete, broad at base. Panicles in upper axils often clustered below velutinous young leaves, usually large with stout peduncles and divaricate branches, 12–50 cm long and as wide, copiously flowered.

Flowers 4—6 mm diam.; pedicels to 6 mm, villous; calyces 4 mm long, lobes ovate, 2.5—3 x 2—2.5 mm, densely villous outside; petals 4, rarely with reduced fifth one, broadly obovate and shortly clawed, 2.5 x 2.5 mm, glabrous; scales 2, broad, as long as petals, crests fleshy, stipitate; disc incomplete, glabrous; stamens 8-10, filaments subulate, 3 mm long, pilose from middle to base; ovary subglobose, hairy, style simple. Capsules yellow-orange, subglobose and 1-celled or transversely ellipsoid, 3 or 2—sulcate or lobed, 1.3—1.8 x 2.5—3 cm, turgid, valves thin, veined, pale rusty velvety hairy on outside, pilose puberulent inside; seeds brown, orbicular, carinate on margins, nearly covered by 2—lobed orange-red acidic aril.

Southern Queensland as far west as Bunya Mountains and to Illawarra District in New South Wales, usually to altitudes around 1,000 m; in rainforests.

Queensland. MORETON DISTRICT: Upper Brookfield, Jun 1926, *White* s.n.; Mt Glorious, Jan 1945, *Clemens* s.n. DARLING DOWNS DISTRICT: Emu Vale on T.R. 399, Nov 1950 (BRI 161867); Bunya Mts, Oct 1919, *White* s.n. **New South Wales:** Hastings River District, Sep 1892 *Brown* s.n.; Clarence River, *Wilcox* s.n.; 17 km NNW Dungog, May 1960, *Story* 7330; Terragon, 20 km S of Murwillumbah on Kyogle Road, May 1978, *Jessup* 118.

Common Name: Native Tamarind.

Uses: Acid fruits (aril) have been used for jam making and for acid drinks. Timber is said to be suitable for general indoor work.

In making the combination *Diploglottis australis*, Radlkofer cited it as *D. australis* (Cunn.) Radlk. and cited *Stadmannia australis* Cunn. as a synonym. Radlkofer intended to base his name on *S. australis* Cunn. In his references to *S. australis* he also cited G. Don, Gen. Syst. 1 (1831) 669. Cunningham's name was published as a synonym without description whereas Don's was validly published and consequently Radlkofer's name has often been cited as *D. australis* (G. Don) Radlk.

The protologue of *Stadmannia australis* G. Don does not apply to the plant described as *Cupania cunninghamii* (to which Hooker referred *S. australis* Cunn.) and by Radlkofer as *Diploglottis australis*. Radlkofer noted that Don had drawn up his description from a cultivated plant and that Cunningham had not been mentioned by Don. It has been suggested that Don described a young plant with few leaflets but this is unlikely as he described it as a spreading tree and noted that it was propagated by cuttings.

As *Cupania cunninghamii* Hook. and *Stadmannia australis* G. Don are not conspecific the latter should be disregarded in deciding the correct name for the Australian plant. The combination *D. cunninghamii* (Hook.) Hook.f. based on *Cupania cunninghamii* Hook. must be used instead of *D. australis* Radlk. The last should be regarded as a new name, not as a new combination, as it was based on an illegitimate name.

8. *Diploglottis diphylostegia* (F. Muell.) F.M. Bailey, Proc. Roy. Soc. Qd 1:148 (1885), Qd Fl. 1:287 (1899). Based on *Cupania diphylostegia* F. Muell., Fragm. 5:145 (1866).

Ratonia diphylostegia F. Muell. l.c., *pro syn.* **Type:** Rockingham Bay, *Dallachy* (not seen).

Diploglottis cunninghamii Hook. f. var. *diphylostegia* J.F. Bailey, Qd Agric. J. 5:396 (Oct 1899); Domin, Biblioth. Bot. 89:906 (1927).

Diploglottis cunninghamii Hook. f. var. *muelleri* F.M. Bailey, Qd Fl. 1:287 (Dec 1899).

Trees 10—30 m tall and to 30 cm girth; young parts densely hairy with spreading pale rusty villous hairs, young leaves rusty velutinous; branchlets usually fluted, tomentose with pale curly hairs intermingled with long spreading rusty hairs, minutely lenticellate. Leaves with petiole 14—38 (—70) cm long, with 2—9 leaflets

each side of rachis; petioles 3–5(–11) cm, ribbed, broad at triscutate base, pubescent; rachises ribbed, 3–7(–21) cm, pubescent; pinnae alternate or subopposite, elliptic-oblong, subobovate-elliptic, oblong or obovate, usually broader above the middle, tips acuminate (usually abruptly and shortly acute-acuminate) or obtuse, sometimes nearly rounded, margins repand, bases oblique, obtuse or acute, 4.5–18.5(–23) x 2–7.5(–9.5) cm, glabrous or puberulent on the nerves above, rusty pubescent or puberulent below, semicoriaceous, lateral nerves 14–22 pairs, suboblique; petiolules 2–6 mm, broad at base, pubescent. Thyriform panicles axillary or pseudoterminal, usually clustered at tips of branchlets below velutinous young leaves, mainly polygamo-gynomonoecious, copiously flowered, 14–29 x 2–26 cm, peduncles densely hairy with long spreading crinkly hairs, laxly branched, branches divaricate, slender, ribbed, cymules 4–7-flowered; bracts ovate-oblong, 4–5 x 1 mm, tomentose outside. Flowers 4–5 mm diam., males smaller; pedicels 2–6 mm, pubescent; calyx lobes ovate, 2–2.5 x 1.5–2 mm; petals 4 or 5, if 5 then one slightly reduced and crestless, spatulate, long clawed, 3–3.5 x 2.5 mm, glabrous; scales bilobed, as long as petals, hairy on margins, crests fleshy; disc crescent-shaped or nearly complete, fleshy, glabrous; stamens 8, filaments 2–3 mm, puberulent or glabrescent; ovary villous tomentose, styles stout, glabrous. Capsules yellowish or orange, transversely ellipsoid 3 or 2-sulcate, 0.8–1.7 x 1.5–2.8 cm; or 1-lobed, globose, 1.3–1.7 x 1.4–1.7 cm; lobes subglobose, chartaceous, pale rusty tomentose outside, pubescent inside, aril acidic, orange-yellow enclosing seed.

Queensland, Claudie River to Eungella Range usually at high altitudes (to 800 m) at edge of rainforest or riverside scrubs.

COOK DISTRICT: Claudie River (12°45'S, 143°20'E), Oct 1973, *Hyland* 7001; Annan River, June 1962, *Gittins* 564; S.F.R. 310, Goldsborough L.A. (17°13'S, 145°47'E), Sep 1972, *Moriarty* 1167; Wongabel S.F.R. 191, (17°20'S, 145°28'E), Oct 1975, *Brassell* s.n.; near Atherton (approx. 17°10'S, 145°30'E), Jul 1972, *Beamish* s.n.; S.F.R. 185 Danbulla, Sept 1929, *Doggrell* s.n. NORTH KENNEDY DISTRICT: Jarra Creek, Tully area, Dec 1952, *White* 432; Rockingham Bay, *Bailey* s.n.; Herbert River, *Eaton* s.n.; Strathdickie near Proserpine, Oct 1936, *McPherson* 90. SOUTH KENNEDY DISTRICT: 29 km W of Mackay, Nov 1976, *Turner* s.n.; Eungella Range, Oct 1922, *Francis* s.n. L EICHHARDT DISTRICT: Bee Creek (21°S, 148°E), *Clemens* s.n. (BRI 161710).

Quite a variable species; e.g. specimens from around Eungella Range and Proserpine usually have fewer leaflets which are obovate with obtuse apices.

ATALAYA

ATALAYA Blume, Rumph. 3 : 186 (1847). **Type species:** *A. salicifolia* (A. DC.) Blume, based on *Sapindus salicifolia* A. DC.

Dioecious shrubs or trees. Leaves paripinnate rarely imparipinnate or simple; petioles and rachises winged in some species; pinnae in 1–6(–10) opposite or alternate pairs, in most species long and narrow, margins entire, coriaceous, lateral nerves usually fine; sessile or petiolulate. Thyriform panicles terminal or in upper axils, usually large and copiously flowered; cymules shortly stalked, dichasial or pleiochasial. Flowers polygamous; pedicellate; bracteate; sepals 5, imbricate, unequal, suborbicular or elliptic-obovate, concave; petals 4 or 5, elliptic-obovate shortly clawed, usually appressed hairy on outside with glabrous apical margin, scales bilobed, rarely minute; crests usually absent (present in one species), or scales provided with slender appendages; discs annular, complete (incomplete in one species); stamens 8, filaments erect, pilose, anthers oblongoid, usually glabrous; ovaries obovoid, 3-lobed, with 1 ovule per loculus. Fruits divaricately 3 or 2(–1)-lobed, apiculate (residual style), separating into indehiscent, 1-seeded dorsally winged samaras; samaras mostly obliquely depressed obovate; wings laterally elongated or ± erect, truncate, obtuse; seeds without an aril.

Eleven species from Africa to E. Malaysia, Papua and Australia; nine (four new) in Australia.

1. Leaves simple, rarely pinnate. Petals densely hairy all over on outside with sericeous white long hairs. 1. *A. sericopetala*
Leaves pinnate rarely simple (abnormal). Petals usually hairy from above middle to base, apical margin puberulent or glabrous. 2
2. Rachises and petioles broadly winged with leaf-like closely and prominently reticulate wings. Pinnae usually sessile 2. *A. variifolia*
Rachises and petioles rarely winged (except in juvenile ones), wings if present narrow, not as above. Pinnae petiolulate. 3
3. Pinnae usually linear and long and falcate, more than 4 times as long as wide, 0.3–1.5 cm wide; rachis and petioles often narrowly winged 4
Pinnae not as above, less than 4 times as long as wide, 1.5–7.5 cm wide; rachis and petiole wingless. 6
4. Pinnae green on both surfaces; glabrous; usually 2 or 4; rachis and petioles often winged. Flowers and fruits glabrous 3. *A. salicifolia*
Pinnae glaucous especially on lower surface; glabrous or puberulent; 2-17; rachis and petiole sometimes narrowly winged. Flowers and fruits usually hairy 5
5. Pinnae usually 2–4 (rarely –6 or –10), opposite, 6–16 x 0.3–1.5(–2) cm, usually puberulent below; rachises rarely winged (except in some juvenile ones). Flowers 8–14 mm diam. 4. *A. hemiglauca*
Pinnae 8–12(–21), very rarely fewer, opposite or alternate, 1.5–7 x 0.2–0.5 (–1) cm, glabrous; rachises narrowly winged. Flowers 5–9 mm diam. 5. *A. angustifolia*
6. Pinnae usually 1–paired (rarely 2 pairs), obovate or obovate-elliptic-oblong, tips rounded, broad, truncate or retuse; lower surfaces usually glaucous 7
Pinnae in 2 or 3 pairs (rarely 1 pair), elliptic oblong, subobovate, broadly ovate or narrowly elliptic ovate-oblong, tips obtuse, rounded, or acute; lower surfaces not glaucous 8
7. Pinnae 2–4, with acute or cuneate decurrent bases, glabrous, with numerous prominent oblique lateral nerves. Petals 4, crested; disc incomplete crescent-shaped. Fruits with obliquely oblong spatulate, divaricate, glabrous wings. 6. *A. multiflora*
Pinnae 2, with very oblique unequal bases; hairy; with few lax lateral nerves. Petals 5, not crested; disc complete, annular. Fruits with oblong cuneate, truncate, hairy wings 7. *A. calcicola*
8. Pinnae long petiolulate (petiolules 1–3.5 cm long); bases unequal, truncate, (cut on one side to second last pair of lateral nerves); surfaces shiny, verrucose, hard and rigid. Peduncles usually very angular. Panicles 25–38 x 24–33 cm with copiously flowered cymules. Flowers large, 8–10 mm diam.; sepals and petals membranous; petals 7–8 x 3.5–4 mm 8. *A. rigida*
Pinnae shortly petiolulate (petiolules 3–6 mm long); bases oblique obtuse; surfaces not hard and rigid, and shiny. Peduncles not angular. Panicles 10–24 x 13–24 cm, with few flowered cymules. Flowers small, 4.5–6.5 mm diam; sepals coriaceous; petals 4–5 x 1.5–2 mm. 9. *A. australiana*

1. *Atalaya sericopetala* S.T. Reynolds, species nova affinis *A. australiana* foliis plerumque simplicibus et petalis extus omnine sericeis praesertim differt.
Typus: COOK DISTRICT: Morehead River, 102.4 km N of Laura, 6 Sep 1971, A.K. Irvine 53 (BRI holo, QRS iso).

Shrubs or small trees 2–3 m, young parts, peduncles and pedicels finely pubescent with pale rusty hairs; branchlets slightly ribbed, striate, somewhat viscid, lenticellate, pubescent to glabrescent. Leaves simple or paripinnate with 3–4 pairs of leaflets; simple ones elliptic or elliptic-subobovate-oblong, 4.5–17 x 2–8 cm; petioles 0.5–3.5 cm, terete, pulvinate, glabrous; rachises 3.5–7 cm, terete, wingless; pinnae elliptic or oblong-ovate, 8–9.5 x 3.5–5 cm, tips obtuse, margins wavy, bases oblique, obtuse, subequal, puberulent especially below, coriaceous, shiny above, midribs ridged above, usually hairy, lateral nerves 10–26 pairs, reticulation prominent; petiolules 0.8–1 cm, pulvinate. Panicles large, copiously flowered, 8–27 x 2–22 cm, peduncles finely ribbed, ultimate cymules 3–7-flowered. Buds sericeous; flowers cream, 4–6 mm diam. males smaller; pedicels to 2.5 mm long; sepals elliptic-oblong, 2.5–3 x 2 mm, densely sericeous outside; petals 3–3.5 x 1.5–2 mm, densely sericeous hairy over the whole surface on outside, scales bilobed or subentire, densely hairy on margins, crests absent; disc annular, glabrous, often resinous; filaments densely hairy, 2–3 mm long. Samaras 2.5–3.2 cm long, yellow pubescent; wings ± erect, divaricate, obliquely oblong-cuneate, recurved, to 1.4 cm wide at broadest part, margins subentire.

Northern Queensland from Coen to McLeod River, W of Mossman; in monsoon and riverine forests.

COOK DISTRICT: Coen, Jan 1906, *Garraway* s.n.; 3.2 km S of Bathurst Bay (14° — S, 144° — E), Sep 1970, *Hyland* 4656; Groganville (16°25'S, 144°20'E), Dec. 1974, *Hyland* 7928.

The new species is allied to *A. australiana* from which it differs particularly in the usually simple leaves and petals densely sericeous all over the outer surface.

2. *Atalaya variifolia* F. Muell. ex Benth., Fl. Aust. 1:463 (1863); F.M. Bailey, Qd Fl. 1:300 (1899); Domin, Biblioth. Bot. 89:900 (1927); Radlk., Das Pflanzen. Sapin. 2, 94b:611 (1932). Based on *Thouinia variifolia* F. Muell., Fragm. 1:45 (1858). **Syntypes:** Tropical Australia (Sea Range; Macadam Range; near Fitzmaurice River), *F. Mueller* (none seen).

Small trees 3–8 m; young parts velvety tomentose, branchlets and peduncles slightly ribbed, velvety hairy, lenticellate. Leaves pari- or imparipinnate, often simple with or without lobes, 13–40 cm long including petiole; petioles 3.5–10.5 cm long, broadly winged at apex tapering to base; rachises 3.5–14(–18) cm, with 2–7 sessile or subsessile leaflets; wings of rachis and petiole, oblique, subequal, leaf-like; pinnae subopposite or alternate, variable, mostly narrowly elliptic oblong, apices obtuse, margins entire, repand, bases acute, decurrent, 7–23 x 1.2–2 cm, glabrous or lower surfaces puberulent, coriaceous, midribs ridged above, broad and prominent below; reticulation dense; petiolules to 2 mm long, tumid, often obsolete. Panicles terminal, usually laxly branched and copiously flowered, 10–24 x 6–24 cm. Buds yellow hairy; flowers creamy white, about 5 mm diam.; pedicels 5–7 mm long, villous; sepals ovate-orbicular, 2–3.5 x 1.5–2 mm, membranous, sericeous pubescent outside; petals obovate shortly and abruptly clawed, 6 x 4 mm, pubescent on outside from middle to base, margins ciliolate; scales bilobed with linear appendages, villous; filaments pilose, 5 mm long; ovaries villous. Samaras with ± erect wings, to 5.5 cm long, tomentose; wings depressed obovate, broadest part of wing 1.5–1.8 cm wide, margins crenulate or subentire.

Northern Australia from Weipa to Irvinebank in Queensland, Darwin-Gulf area, Northern Territory and Kimberley Province, Western Australia, in a variety of habitats.

Northern Territory. E. Alligator R., near crossing, Nov 1972, *Byrnes & Martensz* 2820; Oenpelli (12°18'S, 133°4'E), Oct 1948, *Specht* 1265. **Western Australia:** Kimberley Province, Lazarides s.n. **Queensland.** COOK DISTRICT: Weipa, Nov 1969, *Nicholson* s.n.; N of Palmerville (15°39'S, 144°05'E), Nov 1965, *Pedley* 1856; Channel Rd. between Walsh River Crossing & Dimbulah (17°19'S, 145°15'E), Oct 1975, *Hyland* 8466.

3. *Atalaya salicifolia* (DC.) Blume, Rumphia 3:186 (1847); Benth., Fl. Aust. 1:463 (1863); Radlk., Das Pflanzen. Sapin. 2, 98b:609 (1932). Based on *Sapindus salicifolius* DC., Prod. 1:608, n 13 (1824). **Type:** Timor (not seen).

Thouinia australis A. Rich., Sert. Astro. t. 12, 31 (1834). **Type:** Melville Island, *Fraser* (not seen).

Atalaya australis (A. Rich.) F. Muell., Fragm. 1:46 (1858). Based on *Thouinia australis* A. Rich.

Atalaya salicifolia (DC.) Blume var. *intermedia* C.A. Gardner, Bot. Notes Kimberley Div. W.A., 61 (1821). **Type:** Carson River, Sep 1921, *C.A. Gardner* 1556 (PERTH, iso).

Atalaya virens C.T. White, Proc. Roy. Soc. Qd 55:62 (1944). **Type:** Eidsvold, *Dr. T.L. Bancroft* (BRI, holo).

Shrubs to spreading trees with drooping branches 3–10 m; bark grey with transverse ridges; young parts puberulent; branchlets pale with minute lenticels. Leaves paripinnate with 1–2(–3) pairs of leaflets, 2–18 cm long including petiole; petioles 1.5–6(–8) cm, pulvinate; rachises 1–3(–9) cm long, rachises and petioles usually narrowly winged; pinnae opposite, narrowly elliptic-oblong or obovate-

oblong, obtuse or subacute at apices, acute at bases, 4.5–8.5 x 0.7–1.8 cm (juveniles to 16 x 4 cm), glabrous rarely puberulent, green on both surfaces, shiny above; lateral nerves 11–14 pairs, fine; petiolules 1–5 mm long, pulvinate, subglabrous. Panicles terminal or axillary, laxly branched, 8–26 cm long and to 16 cm wide, peduncles puberulent to glabrous; bracts to 1 mm long. Buds usually glabrous; flowers 7–10 mm in diam.; pedicels 4–7 mm, subglabrous; sepals 2–3 x 1.5–3 mm, glabrous; petals obovate, abruptly shortly clawed, 5–7 x 2.5–3.5 mm, puberulent towards the base outside, scales bilobed as long as petals, hairy, with 2 slender appendages; discs annular, glabrous; filaments pilose, 3–3.5 mm long; ovaries 2 or 3–lobed, slightly villous hairy on angles otherwise glabrous. Samaras glabrous, with \pm divaricate, falcate obovate-oblong wings, 2.5–3.5 cm long, broadest part of wing to 2 cm wide.

From Timor to Torres Strait, northern Queensland to as far south as Richmond River, New South Wales; also in Northern Territory and Western Australia. In dry rainforests on stony soil, usually on hillsides.

Timor: South, Middle Timor, alt. 700 m (BRI 244164). **Western Australia:** Carson River, Sep 1921, Gardner s.n. (PERTH); Careening Bay, Oct 1820, *Cunningham* (K). **Queensland.** COOK DISTRICT: Torres Straits, S.E. of Prince of Wales Island, off Packe Is., Feb 1975, *Cameron* 20107 & 20108; about 3.2 km S.E. of Coen, to N of Port Stewart Rd, Oct 1962, *Smith* 11990. NORTH KENNEDY DISTRICT: Kinrara (18°30'S, 145°3'E), Nov 1941, *Blake* 14443. PORT CURTIS DISTRICT: Butlerville via Mt Larcom, Oct 1962, *Roffe* s.n. LEICHHARDT DISTRICT: Gogango Ra near Edungalpa, Sep 1943, *Blake* 15347. WIDE BAY DISTRICT: Biggenden, Oct 1930, *White* 7337. BURNETT DISTRICT: Goodnight scrub about 65 km SW of Bundaberg, Jun 1957, *Smith* 9855. MORETON DISTRICT: Blackbutt Ra (26°S, 152°E approx.), Dec 1968, *Trappnell & Williams* s.n.; between Lake Moogerah and Boonah, Sep 1977, *Jessup* 10. **New South Wales.** Reported from Lismore to Warialda. Kyogle, Dec 1942, *King* s.n.

Common name: Whitewood.

4. *Atalaya hemiglauca* (F. Muell.) F. Muell. ex Benth., Fl. Aust. 1:463 (1863); F.M. Bailey, Qd Fl. 1:300 (1899); Domin. Biblioth. Bot. 89:900 (1927); Radlk., Das Pflanzen. Sapin. 2,98b:610 (1932). Based on *Thouinia hemiglauca* F. Muell., Fragm. 1:98 (1863). Types: Mt Murchison,? *Dallachy & Goodwin* (not seen); N.W. Coast, *Bynoe* (K); Hammersley Range, Nichol Bay, *F. Gregory* (MEL 74649); Rockhampton, Canoona Rd, *Thozet* (MEL 74650); Albert River, *Henne* (MEL 74651); Moonie River, *Mitchell* (K); Liverpool Plains, May 1925, *A. Cunningham* (K)

More or less glaucous small trees, 3–6m; young parts puberulent; branchlets striate, lenticels minute. Leaves paripinnate with 1–3(–6) pairs of leaflets, rarely leaves simple and broad, ovate; petioles 0.8–4.5 cm, terete, pulvinate, usually wingless, subglabrous or glabrous; rachises 1.2–4.5(–8.5) cm long, winged only in juvenile leaves, then to 18 cm long; pinnae opposite, elongate, narrowly elliptic-obovate or oblong-ovate or linear-oblong, usually falcate, tips obtuse or subacute, bases usually acute, 6–16(–20) x 0.3–1.5(–2) cm, glabrous or with short appressed puberulence, coriaceous, dull bluish-green, drying glaucous below; petiolules 1–5 mm long, pulvinate. Panicles terminal or axillary, laxly branched, 6–18(–23) cm long and as wide, peduncles puberulent or glabrous; bracts 2–3 x 1.5 mm, ovate. Buds sericeous; flowers white, fragrant, 0.6–1 x 1–1.4 cm; pedicels 2.5 mm long, puberulent; sepals obovate, 2.5–5 x 2–3 mm, pubescent to glabrous; petals obovate shortly clawed, to 8 x 3.5 mm, sericeous especially towards the base on outside, margins glabrous; scales bilobed, crestless, villous; filaments 2.5–4 mm long, pubescent; ovaries usually velvety hairy. Samaras with usually \pm erect wings, 2.1–3.8 cm long, tomentose to puberulent with appressed hairs; wings depressed obovate, truncate with crispate or crenate margins, 1–1.3 cm wide at broadest part.

A widespread inland species in all states except Victoria and Tasmania, common in tropical Queensland, Northern Territory, Western Australia, western New South Wales and South Australia, growing in a variety of soils in dry open mixed forests, edges of brigalow scrubs and deserts.

Northern Territory: Argadargarda S.R., 18 bore, Sep 1954, *Chippendale* s.n. (NT 298); 32 km W of Katherine, Sep 1961, *Speck* 1663; 18.7 km N of Daly Waters P.O., Sep 1957, *Chippendale* s.n. (NT 3748); 112 km SE Ringwood Homestead, Simpson Desert, Oct 1954, *Winkworth* 633. **Western Australia:** Round Kununurra-Ord Dam and Wyndham Rd, Sep 1970, *Scarth-Johnson* 536; 11.2 km S of Derby, Sep 1959, *Lazarides* 6585; Halls Creek, Sep 1970, *Scarth-Johnson* 578. **Queensland:** COOK DISTRICT: about 32 km WNW of Chillagoe, Nov 1965, *Pedley* 1825; 3 km E of Inverleigh on Normanton Rd, Oct 1977, *Irvine* 1871; Lyndhurst Station Einsleigh River, Sep 1937, *Brass & White* 335. NORTH KENNEDY DISTRICT: about 96 km S of Mt Garnet and 80 km W of Ingham, Oct 1967, *Morain* 130; Lower Burdekin River, 1962, *Wyatt* 16. BURKE DISTRICT: Hughenden, Oct 1935, *Blake* 9991; Mt Isa, Oct 1974, *Specht & Rogers* 68 & 137; Doomadgee Mission, *Whitehouse* s.n. LEICHHARDT DISTRICT: Boot Hill Ck about 70 km SW of Sarina, Apr 1970, *Williams* s.n.; Mt Playfair about 96 km ESE of Tambo, Oct 1963, *Biddulph* s.n. MITCHELL DISTRICT: 48 km NE of Longreach, Sep 1967, *McCray* s.n.; Blackall, Oct 1937, *Everist* 1563. GREGORY NORTH DISTRICT: Between Glenormiston and Toko Ranges, Jan — Feb 1935, *Boyle* s.n.; 19 km NNW of Pathungra (22°12'S, 140°34'E), Sep 1977, *Purdie* 1028. SOUTH KENNEDY DISTRICT: 120 km N of Belyando River, Aug 1973, *Trapnell & Williams* 68. PORT CURTIS DISTRICT: Between St. Lawrence & Marlborough, Oct 1937, *White* 12093; 2 km S of Rosewood Homestead, Feb 1964, *Speck* 1808. DARLING DOWNS DISTRICT: Between Meandarra and Westmar, Nov 1958, *Pedley* 334; MARANOVA DISTRICT: Murilla, 14.4 km NW of Glenmorgan, Nov 1958, *Johnson* 636; Gubberamunda near Roma, Oct 1930, *Jensen*, s.n. WARREGO DISTRICT: Oakwood Station, about 80 km N of Charleville, Oct 1940, *Smith & Everist* 869; About 48 km NNE of Thargomindah along road to Quilpie, Nov 1954, *Smith* 6067. **South Australia:** Stevenson River about 10 km E of Pedirka, Sep 1932, *Ising* s.n. **New South Wales:** Warrumbungle — Toorawenah Rd, Dec 1973, *Streimann* s.n.; Monolon Station, 48 km ESE of Milparinka, Oct 1963, *Constable* 4591.

A very variable species in density of indumentum of leaves and flowers; width of leaflets and length of petiolules e.g. *Specht & Rogers* 68 & 137, *Irvine* 1871, and *Purdie* 1028, like type from Albert River (Burke District) *Henne* have very narrow leaflets which are linear-ovate-oblong, falcate, 3—5 mm wide and about 20—30 times as long as wide; subsessile; glabrous; flowers also glabrous. Glaucescence also varies with age.

Common Name: Whitewood.

Uses: The plant is regarded as a very good fodder tree. Its toxicity has been the subject of considerable investigation; field evidence suggests that it can cause staggers in sheep, cattle and horses (Everist 1974).

5. *Atalaya angustifolia* S.T. Reynolds species nova *A. hemiglaucæ* proxima a qua praecipue differt foliolatis parvioribus angustis et plerumque pluribus (4—11 paribus). **Typus:** Cook District: 107.2 km S of Laura (15°40'S, 144°30'E), 17 Sep 1971, *A. Irvine* 79 (BRI holotypus, QRS isotypus).

Shrubs or small trees 0.5—4 m; young parts pubescent; lenticellate. Leaves paripinnate with (1—)4—6(—11) pairs of fine narrow leaflets, 9.5—17 cm long including the petiole; petioles 1—3.5 cm, slender, pulvinate, often winged; rachises 2—11 cm, adaxially ridged, narrowly winged; pinnae subsessile or sessile, opposite or alternate, narrow, linear-obovate or linear elliptic-oblong, falcate, apices obtuse or subacute, apiculate, bases attenuate, acute, 1.5—7 x 0.2—0.5(—1) cm, glabrous, drying paler below; lateral nerves and reticulations very fine; petiolules to 1 mm long, tumid, often obsolete. Panicles terminal, copiously flowered, 13—25 x 3—10 cm, peduncles slender, usually pubescent. Flowers creamy white, 5—9 mm diam., females larger; pedicels 3 mm long, pubescent; sepals obovate, orbicular or elliptic, usually thin, 2.5—5 x 2 mm, sericeous pubescent outside with glabrous margins; petals subobovate-orbicular shortly clawed, 4.5—7 x 2—3 mm, hairy outside from middle to base, margins ciliolate; scales bilobed, densely hairy, with 2 slender appendages; discs annular, fleshy, glabrous; filaments pilose, 2.5—3 mm long; ovaries trigonous, villous tomentose, styles short. Samaras with divaricate or suberect wings, velvety tomentose, 2.5—4.2 cm long; wings obliquely oblong-cuneate, subtruncate, 1.1—2 cm wide at broadest part, margins crispate.

Northern Queensland around Cooktown and Laura; in open woodlands or dry scrubs, usually on quartz gravel.

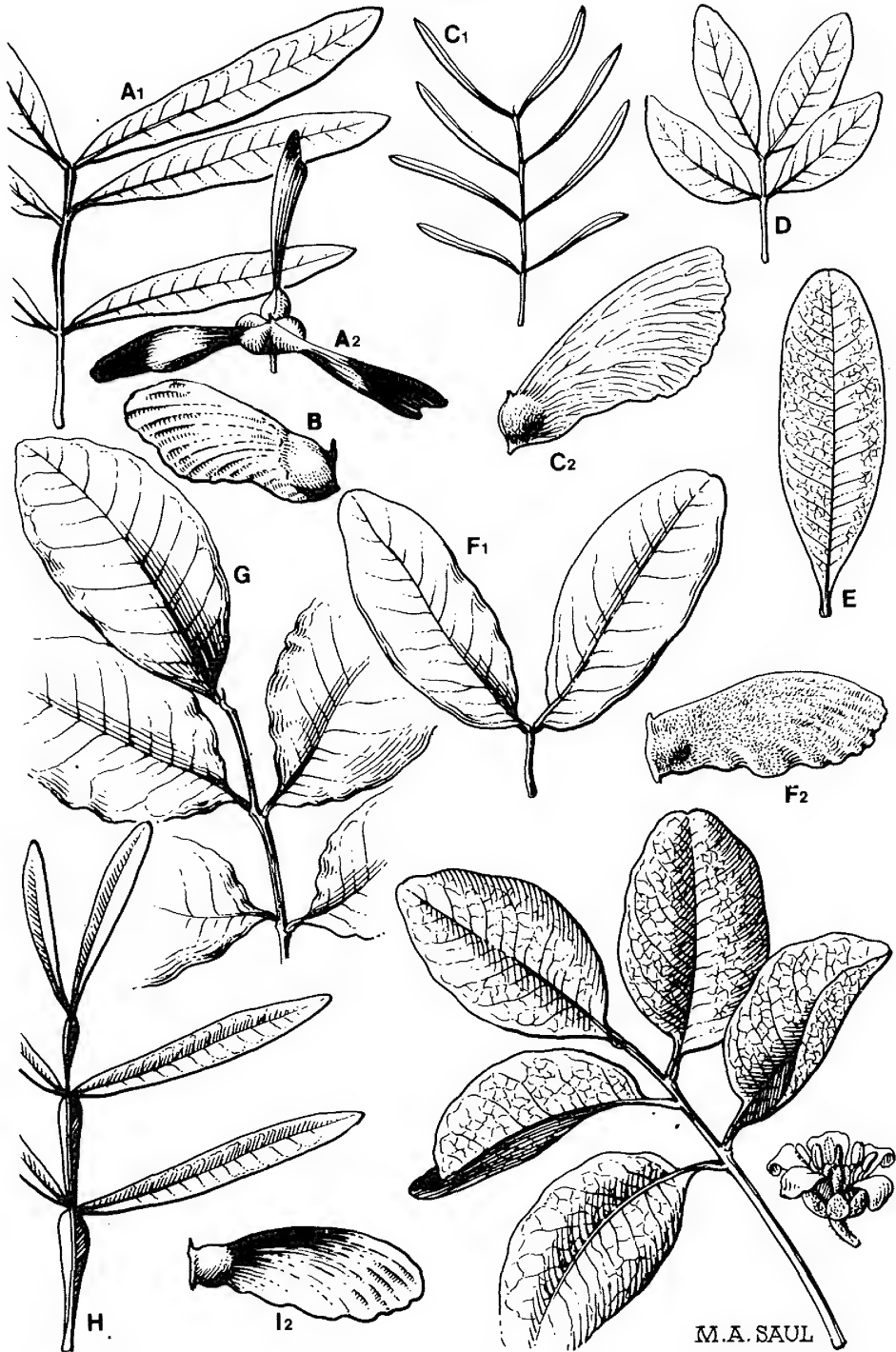


Figure 27. *Atalaya*. A. *A. salicifolia*. A1. Leaf. A2. Fruit. B. *A. hemiglauca*, fruit. C. *A. angustifolia*. C1. Leaf. C2. Fruit. D. *A. multiflora*, leaf. E. *A. sericopetala*, leaf. F. *A. calcicola*. F1. Leaf. F2. Fruit. G. *A. ausraliana*, leaf. H. *A. variifolia*, leaf. I. *A. rigida*. I1. Leaf. I2. Fruit. I3. Flower.

Cook District: Kennedy River, Oct 1969, *Webb & Tracey* s.n.; Annan River about 8 km SSW of Cooktown, Aug 1959, *Smith* 10759; 99 km W of Cooktown, Aug 1966, *Story* 7968.

The new species is closest to *A. hemiglauca* but differ chiefly in having smaller, narrow and usually more leaflets (4–11 pairs).

6. *Atalaya multiflora* Benth., Fl. Aust. 1:463 (1863); F.M. Bailey, Qd. Fl. 1:300 (1899); Domin, Biblioth. Bot. 89:900 (1827); Radlk., Das Pflanzen. Sapin. 2, 28b:607 (1932). **Type:** Brisbane River, *F. Mueller*, Dec 1856 (MEL 74652 lectotypus novus); *W. Hill & F. Mueller*, 1858 (K, syntype).

Pseudatalaya multiflora Baill., Nat. His. Pl. 5:419 (1874) based on *Atalaya multiflora* Benth.

Small trees; young parts pubescent; branchlets slightly ribbed with minute pale lenticels especially in grooves. Leaves paripinnate with 1–2(–3) pairs of leaflets, 4.5–16 cm long, including petiole; petioles 1–4.5 cm, semiterete, pulvinate; rachises 1–2.5(–6) cm, semiterete, winged in juveniles; pinnae opposite, oblong or obovate-elliptic or obovate, apices broad, truncate or retuse, bases cuneate, acute, decurrent into petiolules, or obtuse, usually oblique, 4–9.5(–11.5) x 1.5–4.5(–7.5) cm, glabrous, coriaceous, upper surfaces glossy, drying dark reddish brown, lower ones paler; lateral nerves subpatent or oblique, nerves and reticulations raised and prominent especially below; petiolules 2–6 mm long, tumid, pulvinate. Panicles terminal or in upper axils, copiously flowered with densely flowered cymules, 4.5–17(–25) x 5–14 cm, peduncles puberulent; bracts ovate 1.2–5 mm long. Buds sericeous; flowers white, 7 mm diam; pedicels 5–6 mm long, pubescent; sepals broadly obovate, 3–3.5 x 2–5 mm, semicoriaceous, sericeous pubescent outside except the margins; petals obovate, clawed, 6 x 3 mm, inside glabrous except densely hairy crested scale, puberulent on claw outside; disc unilateral, glabrous; filaments 4–5 mm long, pilose; ovaries villous at the upper angles, glabrous elsewhere. Samaras with somewhat divaricate oblong cuneate wings, 3.5 cm long, subglabrous, broadest part of wing to 1.4 cm wide.

Queensland, from Proserpine to near Beechmont. Quite rare, has not been collected since 1943.

NORTH KENNEDY DISTRICT: Kelsey Creek, Proserpine, *Thorogood* s.n. PORT CURTIS DISTRICT: Rockhampton, *Higgins* s.n. WIDE BAY DISTRICT: Imbil, Dec 1943, *Clemens* s.n. MORETON DISTRICT: Pedwells Scrub near Samford, Jul 1925, *Francis* s.n.

7. *Atalaya calcicola* S.T. Reynolds, species nova, a speciebus ceteris Australianis pari uno foliorum basibus valde inaequalibus et paginis plerumque pubescentibus. **Typus:** Cook District: Chillagoe-Alma-den road 5 km from Chillagoe, 10 Mar 1980, *Simon & Clarkson* 3596 (BRI holotypus).

Trees 7–10 m; young parts pale rusty tomentose; branchlets ribbed, velvety with dense crispate hairs intermingled with long simple hairs; young leaves with silky long hairs. Leaves bifoliolate; petioles 1–2.5 cm, isobilateral, tomentose; pinnae opposite, obovate-elliptic with very unequal, subfalcate base, (acute on one side, obtuse and cut to second or third pair of basal lateral nerves on other), tips obtuse emarginate, 6–14 x 2.8–5.5 cm, surfaces pubescent or puberulent with appressed long hairs, midribs tomentose, upper surfaces drying darker, lower ones usually glaucous; lateral nerves 8–10 pairs, lax, reticulations also lax; petiolules 2–4 mm, semiterete, pulvinate, tomentose. Panicles terminal or axillary, laxly branched and flowered, 4–10 cm long and as wide, peduncles densely hairy with both crispate and long spreading hairs. Flowers white, 7 mm diam.; pedicels 5 mm long, tomentose; sepals broadly ovate, ± membranous, 3–4 x 2.5–3 mm, white hairy outside; petals obovate shortly and abruptly clawed, 6 x 2.5 mm, rusty hairy outside, membranous, margins ciliate, recurved at base with small bilobed or rudimentary hairy scale,

crests absent; disc annular, glabrous; filaments pilose, 3 mm long; ovaries densely villous. Samaras with laterally elongate divergent wings 3.2–5.5 cm long, white tomentose hairy, wings cuneate-oblong, broad, blunt, with wavy crispate margins and apex, broadest part of wing 1.4–4 cm wide.

Northern Queensland, restricted to limestone outcrops around Mungana-Chillagoe and Almaden, usually growing in deciduous vine thickets.

COOK DISTRICT: 6.4 km N of Mungana (approx 17°05'S, 144°25'E), May 1970, *Webb & Tracey* 10197; Chillagoe, in 1962, *Webb & Tracey* 8028; Almaden-Chillagoe Rd about 5 km from Chillagoe (17°10'S, 144°32'E), Aug 1973, *Moriarty* 1448.

This species differs from other Australian species in having only one pair of leaflets with every unequal bases and their surfaces usually pubescent.

8. *Atalaya rigida* S.T. Reynolds, species nova. Foliola respectu formae accendentia ad *A. australianam* sed respectu texturae dura rigidaque; et flores grandiores sunt. **Typus:** North Kennedy District: Strathdickie North, near Proserpine, Oct 1937, *K.A. Macpherson* 123 (BRI holotypus, QRS isotypus).

Small upright trees, seldom branched; young parts pubescent; branchlets ribbed, minutely pubescent or puberulent with short hairs; lenticels pale. Leaves paripinnate, 15–19 x 16–23 cm; petioles 2–5.5 cm, terete, trisulcate and pulvinate at base; rachises 3.5–14 cm long, subterete, adaxially ridged, wingless, finely puberulent with 2–4 leaflets on each side; pinnae alternate, broadly ovate or elliptic, tips obtuse, bases subequal, truncate cut on one side to second last pair of lateral nerves, oblique (often obtuse one side and truncate on the other), 10–14.5 x 5.5–7.5 cm, glabrous, thickly coriaceous, usually hard, rigid, shiny and vernicose above, pale below; lateral nerves 8–11 pairs, straight, arched at tips, reticulations dense, prominent; petiolules semiterete, channelled above, 1–3.5 cm, pubescent. Panicles terminal or subterminal, densely flowered, 25–38 x 24–33 cm; peduncles usually very angular, slightly ribbed, minutely pubescent, cymules copiously flowered; bracts 2 mm long, ovate. Buds-hoary; flowers (female) white, 8–10 mm diam.; petioles 4–6 mm long, tomentose; sepals obovate, 3–3.5 x 2 mm, membranous, hoary pubescent; petals 7–8 x 3.5–4 mm, obovate-oblong, shortly abruptly clawed, white pubescent towards the base and thinning towards apex on outside; scales bilobed, densely villous, crestless, often with slender appendages; disc annular, glabrous; filaments 5 mm long, pilose; ovary trigonous, villous. Samaras with laterally elongate very divaricate wings 3.5–3.8 cm long, pubescent; wings oblong-spathulate, rounded at apex, puberulent or glabrous, to 1.3 cm wide at broadest part, margins subentire.

Queensland, Proserpine area to Mackay.

NORTH KENNEDY DISTRICT: Cannonvale area, in 1976, *Wynne* 25; South Molle Island, Nov 1954, *Fielding* s.n. SOUTH KENNEDY DISTRICT: Mackay, Dec 1938, *MacArthur* s.n.

The leaflets of this species approach those of *A. australiana* with respect to shape but the texture is hard and rigid and the flowers are larger.

9. *Atalaya australiana* Leenh., *Blumea* 13:126 (1968). Based on *Sapindus ? australis* Benth., *Fl. Aust.* 1:464 (1863); F.M. Bailey, *Qd Fl.* 1:301 (1899). **Type:** Cape York, Voy. of Rattlesnake, Bot. 489, 27 Oct 1849, *J. MacGillivray* (K, holo). *Atalaya australis* (Benth.) Radlk., *Sitzungsber. bayer. Akad.* 8:298, n 11, 327 (1878) nom. illeg. non (A. Rich.) F. Muell., *Fragm.* 1:46 (1858); F. Muell., *Syst. Census* 24 (1882) & ed 2:41 (1889); Domin, *Biblioth. Bot.* 89:900 (1927); Radlk., *Das Pflanzen. Sapin.* 2, 98b:608 (1932). Based on *Sapindus australis* Benth., l.c.

Misapplied name: *Atalaya multiflora* Benth., l.c. 463 (1863) p.p. quoad specimens ex Cape York, Oct 1948 *J. MacGillivray*, & Trinity Island, 4 Jul 1848, *J. MacGillivray* (K).

Trees 6–20 m; younger parts, branchlets and peduncles finely pubescent with short straight yellowish hairs; branchlets ribbed with linear lenticels often in the grooves. Leaves 14–25(–32) x 14–20(–36) cm, paripinnate with (1–)2 or 3 pairs of leaflets; petioles 2.2–5.5(–6.5) cm, semiterete, pulvinate and often lenticellate at base, puberulent to glabrous; rachises 1–8(–11.5) cm, bisulcate above, wingless, pubescent or subglabrous; pinnae opposite or alternate, elliptic-oblong, obovate-elliptic or narrowly elliptic-subovate-oblong, tips rounded, obtuse or acute, margins repand, bases usually oblique, acute, or broad and unequal, 6–14(–21) x 1.7–6.5(–7.8) cm, glabrous or lower surfaces subglabrous, often thinly coriaceous; lateral nerves 10–16 pairs, usually patent, nerves and reticulations fine, prominent; petiolules 3–6 mm long, semiterete, often channelled above, pulvinate, pubescent with pale rusty hairs or glabrescent. Panicles terminal, laxly branched and flowered, 10–24 x 13–24 cm, peduncles with pale yellow hairs, cymules few flowered. Buds hoary; flowers cream, 4.5–6.5 mm diam.; pedicels 3–5 mm long, tomentose; sepals elliptic oblong or ovate-elliptic 2–3.5 x 1–2 mm, coriaceous, sericeous or white hairy on outside, apical margin less hairy or glabrous; petals oblong-obovate shortly clawed, 4–5 x 1.5–2 mm, densely appressed hairy on outside from above middle to base with white hairs, margins ciliolate, scales bilobed, densely hairy; disc annular, glabrous; filaments 3 mm long, pilose; ovaries villous. Samaras with ± divaricate wings, 2.5–3.7 cm long, pubescent; wings recurved, falcate obovate-spathulate, rounded at apex, puberulent, margins crenulate or subentire towards apex, to 1.2 cm wide at the broadest part (apex).

Northern Queensland from Torres Strait to near Proserpine; usually in beach scrubs or strand forests, also monsoon forests in hilly country.

COOK DISTRICT: Kubin Village, Banks (Moa) Is, Torres Strait, Aug 1975, *Cameron* 2474 (QRS); Bamaga, Galloways Creek, in 1962. *Webb & Tracey* 7108; Red Island Point about 25 km SW of Cape York, Sep 1963, *Jones* 2478; Oct 1965, *Smith* 12550. NORTH KENNEDY DISTRICT: 23.6 km N Proserpine P.O., Sep 1977, *Guymer* 1117 (NE).

JAGERA

JAGERA Blume, *Rumphia* 3:155 (1847) **Type species:** *J. speciosa* Blume, *nom illeg.* (*J. javanica* (Blume) Blume ex Kalman, based on *Garuga javanica* Blume).

Trees with saponin in bark, twigs, leaves and pericarp; branchlets usually ribbed towards the tip, densely rusty hairy or glabrous. Leaves mostly whorled at tips of branchlets, paripinnate; pinnae usually narrowly ovate-oblong subfalcate, serrate, serrulate or entire at margins, midrib usually excentric, surfaces pellucid punctate. Inflorescences thyriform, often clustered at tips of branchlets in axil of young leaves or fallen leaves, polygamo-androdioecious or -andromonoecious, peduncles ribbed, cymules shortly stalked, 2–7 flowered. Flowers small; pedicels articulate towards base; calyces 5-lobed, lobes ovate, imbricate; petals 5, as long as calyx, clawed, with 2 hairy crested scales; disc annular, glabrous; stamens 7–9, usually exerted; filaments pilose, anthers oblongoid-obovoid, glabrous or margins sometimes puberulent; ovaries sessile, densely setose hairy, 3 or 4-locular, style short. Capsules subglobose, ellipsoid or oblongoid, usually obscurely 3 or 4-sulcate, apiculate, densely rusty setose hairy, 3 or 4-valved; valves woody, verrucose and densely hairy outside with short hairs intermingled with long setose irritant hairs, villous inside; seeds mostly solitary in each cell, obovoid with small basal, cupular aril.

Four species from East Malaysia to New Guinea and Eastern Australia; three (one new and one new record) in Australia.

1. Leaves discolorous, whitish below; leaflets elliptic or elliptic-ovate, entire, 7.5–18.5 x 3–5 (–6.5) cm; petiolules 8–14 mm long. Panicles in upper axils or in axil of fallen leaves or ramiflorous..... 1. *J. discolor*

- Leaves not discolorous; leaflets usually obliquely oblong-ovate, subfalcate, (1.5—) 2.5—17.5 x 0.5—5 cm; petiolules 1—5 mm long. Panicles axillary, in upper axils or clustered at tips of branchlets in axil of and below densely hairy very young leaves and bracts. 2
2. Pinnae 8—18 (—20) in number, 2.5—11.5 x 1—3 cm. Panicles 7—25 x 2.2—16 cm, usually laxly branched or unbranched. Branchlets mostly slender, densely rusty hairy to glabrous. (Leaves with petiole (8.5—)17—27(—35) cm long). 2. *J. pseudorhus*
- Pinnae 19—24 in number, 6—17.5 x 2—5 cm. Panicles large, 22—36 x 14.5—19 cm, much branched and copiously flowered. Branchlets stout, fluted, velutinous. (Leaves with petiole 35—51 cm long) 3. *J. serrata*

1. *Jagera discolor* L.S. Smith ex S.T. Reynolds, species nova differt a ceteris foliis satis grandibus ellipticis marginibus integris et paginis infernis albescentibus praeditis. **Typus:** Cook District: Clump Mountain, 7 Nov 1951, L.S. Smith 4977 (BRI holotypus).

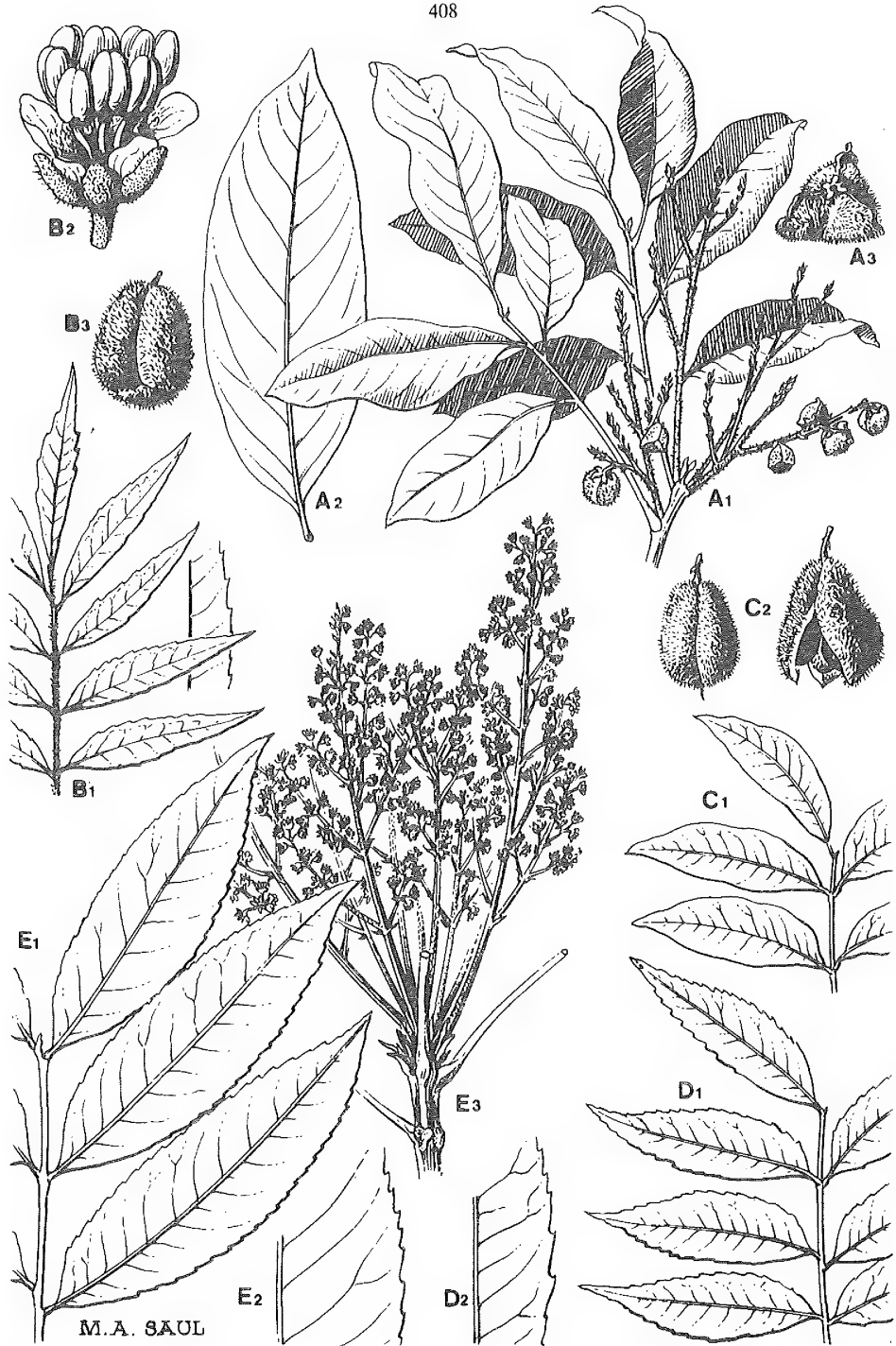
Trees to 25 m high and to 45 cm girth, buttressed; young parts densely rusty hairy; branchlets, petioles, rachises and petiolules with minute appressed rusty tomentum later glabrous; branchlets rounded usually ribbed towards the tip, with numerous pale ellipsoid lenticels especially in the grooves. Leaves discolorous, with petiole 19—42(—54) cm long, with 3 or 4(—6) leaflets on each side of rachis; petioles 7.5—10.5(—14) cm, subterete, pulvinate at broad base, lenticellate; rachises 4.5—20.5(—53 cm in juveniles) cm, subterete, grooved above, striated below, usually lenticellate; pinnae alternate or subopposite, elliptic or elliptic-ovate and oblique or subovate-oblong, tips abruptly and shortly acuminate or acute, margins entire, bases obtuse or acute, unequal. 7.5—15.5(—18.5) x 3—5(—6.5) cm, glabrous above, finely pubescent or puberulent below, lower surfaces papillose, greyish or drying whitish; midribs grooved above, lateral nerves 7—12 pairs, obliquely arched and ascending, usually drying reddish; petiolules 8—16 mm long, decreasing in size towards the tip, subterete, channelled above. Thyrsiform panicles, polygamodioecious, axillary, in upper axils or in axils of fallen leaves, sometimes ramiflorous, 9—14 x 6—8 cm, branching from the base, peduncles densely minutely rusty hairy, ribbed, branches racemiform, slender, divaricate; bracts ovate, 1—3(—5) mm long. Buds subglobose; flowers 4—5.5 mm diam; pedicels 2—4 mm long, pubescent; calyx lobes subequal, oblong-ovate, obtuse, 1—3 x 1.5—2 mm, tomentose outside; petals subspathulate or obovate or suborbicular abruptly contracted into a long claw, crenate or toothed at apex, 2.5 x 2 mm; scales equal, often missing, hairy, crests if present usually small (often absent in females); stamens 7—9, filaments 1.2—3 mm (males longer), pilose, anthers glabrous, 0.5 x 0.3 mm, (usually warty in females); ovaries densely setose hairy and often echinate; styles stout. Capsules reddish with dense rusty setose hairs, trigono-globose, carinate at angles, 1.2—1.6 x 1.2—1.8 cm; 3-valved, valves drying somewhat woody, densely pale villous hairy inside; seeds shiny, brownish.

North Queensland from Mt. Lewis to Mt. Fox and Hinchinbrook Island and also in New Guinea, in high altitude rain forests in mountainous country usually as an understorey tree.

New Guinea. NEW BRITAIN: Mt Talawe, Western slope above Tia, Talasea, May 1966, *Frodin* s.n. (NGF 26792). MOROBE DISTRICT: Ridge near Kui village, Oct 1965, *Gillison* s.n. (NGF 25007). **Queensland:** COOK DISTRICT: Mt Lewis Exp. E/P 18, North Mary L.A. R 143 (16°30'S, 145°16'E), Sep 1973, *Sanderson* 436 (QRS); Copper Lode Falls Dam area, Cairns, Dec 1973, *Birch* 59; R 756, East Downey L.A. (17°40'S, 145°50'E), Nov 1971, *Risley* 28. NORTH KENNEDY DISTRICT: Mt Fox, Oct 1949, *Clemens* s.n.; Moomin, S.F.R. 99, Aug 1953, *White* s.n.

The new species differs from the rest in having fairly large elliptic leaflets with entire margins and whitish lower surfaces.

2. *Jagera pseudorhus* (A. Rich.) Radlk., Sap. Holl. — Ind. 37 (107) (1877); Domin., Biblioth. Bot. 89:906 (1927); Francis, Aust. Rain-For. Trees, ed 3:256 (1970). Based on *Cupania pseudorhus* A. Rich., Sert. Astrolab. 34, f.14 (1834); Benth.,



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Figure 28. *Jagera*. A. *J. discolor*. A1. Fruiting branch. A2. Leaflet (x 1/2). A3. Fruit (x 1). B. *J. pseudorhus* f. *pseudorhus*. B1. Upper part of leaf (x 1/2). B2. Flower (x 6). B3. Fruit (x 1). C. *J. pseudorhus* var. *integerrima*. C1. Upper part of leaf (x 1/2). C2. Fruit (x 1). D. *J. pseudorhus* f. *pilosiuscula*. D1. Upper part of leaf (x 1/2). D2. Leaf margin (x 1). E. *J. serrata*. E1. Upper part of leaf (x 1/2). E2. Leaf margin (x 1). E3. Inflorescence (x 1/3).

Fl. Aust. 1:459 (1863); F. Muell., *Fragm.* 9:92 (1875); F.M. Bailey, *Qd. Fl.* 1:292 (1899). **Type:** Hastings River, Port Macquarie, *Fraser* (not seen).

Cupania setigera Cunn. ex Heynh., *Nomencl.* 1:239 (1840). **Type:** Moreton Bay, *A. Cunninghamham* (not seen).

Trees 4–10 m, often spreading; young parts usually densely villous hairy; branchlets usually slender, ribbed towards tip, densely rusty hairy to glabrous. Leaves clustered at tips of branchlets, with petiole (8.5–)17–27(–35) cm long with 4–10 leaflets each side of rachis; petioles 1.5–12 cm, subterete, trisulcate at broad base, hairy or glabrous; rachises 8.5–18 (–26) cm subterete, densely villous to glabrous; pinnae opposite to alternate, obliquely elliptic- or oblong-ovate, often falcate, acute or acuminate at apices, margins serrate, serrulate or entire, bases unequal, oblique, obtuse or acute, (1.5–) 2.5–11.5 x 0.5–3.2 cm, glabrous or puberulent above, pubescent to glabrous below, semicoriaceous, shiny above; midrib excentric, reticulation usually prominent; petiolules 1–3 mm long. Panicles usually clustered at tips of branchlets below very young densely rusty villous leaves or in upper axils, 4.5–25 x 4–16 cm, peduncles densely rusty tomentose to puberulent or glabrous; cymules 2–7 flowered; bracts linear ovate-oblong or subulate 2.3–8 x 1.5 mm. Flowers 4–6 mm diam.; pedicels 2–6 mm long; calyx lobes 2–2.5 x 1.5 mm, hairy or glabrous outside; petals obovate, clawed, 3 x 2 mm, scales broad, densely hairy on margins, crests slender or clavate and fleshy; stamens 8–10, exerted, filaments subulate, 2–6 mm long, anthers oblong-obovoid, 2–2.5 x 1.2 mm, glabrous or margins villous; ovaries oblong-ovoid, usually 3-grooved, densely tosetose hairy, style to 3 mm long. Capsules ellipsoid, obovoid or oblongoid, 3 or 4 sulcate, 1.4–1.8 x 1.2–1.5 cm, 3 or 4 valved, densely hairy outside with brown setose irritant hairs, villous inside; septa thick; seeds ellipsoid, dark brown with basal aril.

New Guinea and eastern Australia. Most common at edge of rainforests, along creek and river banks on alluvial and basaltic soils.

Common Name: Foam Bark Tree or Fern Tree, also known as Pink Tamarind.

Uses: Trees are quite ornamental and are said to be used for honey production. Timber is light pinkish brown, close grained and has been suggested for tool handles. The bark contains large amounts of saponin and has been used as a foaming agent in lieu of soap by the natives of New Guinea. The bark is also used as a fish poison by aborigines.

A very polymorphic species. Two varieties and several forms are distinguished here with the extreme forms merging into the other.

1. Margins serrate, serrulate or subentire, a few leaflets sometimes entire but others of the same leaf with at least a few serrulations. Reticulate venation prominent on both surfaces; lateral nerves not impressed above. var. *pseudorhus*
(widespread Queensland and northern N.S.W.).
- Margins always entire. Reticulate venation indistinct above; lateral nerves usually impressed above. var. *integerrima*
(Atherton Tableland).

2a. *J. pseudorhus* var. *pseudorhus*

Character as for the species and key above. Very variable in density of indumentum, leaflet size and margins and also size of inflorescences. Two forms are distinguished, the extreme forms intergrading.

1. Leaves, inflorescences and branchlets densely rusty hairy. Pinnae 14–18 in number, rarely less or more, 2.5–6 x 1–2.5 cm. Panicles usually clustered at tips of branchlets, divaricately branched, 4–26 x 4–16 cm, peduncles densely hairy forma *pseudorhus*
(Southern form.)
- Leaves, inflorescences and branchlets puberulent or glabrous. Pinnae 8–18 in number, 4–7.5 x 1–2.8 cm. Panicles in upper axils, unbranched or with few short branches, 9–18 x 2–6.5 cm, peduncles usually puberulent to glabrous forma *pilosiuscula*
(in warmer regions from New Guinea to northern Queensland, finds its southern limits at Fraser Island).

forma pseudorhus

Trees 4–9 m, usually spreading, branchlets densely hairy to puberulent; petioles, rachises, petiolules and peduncles densely rusty villous. Leaves with petiole 12–21 cm long, with (4–)7–9(–12) leaflets each side of rachis; petioles 1.5–12 cm; rachises 8.5–15(–20.5) cm; pinnae opposite or alternate, usually elliptic-ovate-oblong, falcate, tips acute-acuminate or acute, margins serrulate to subentire, bases oblique, obtuse or rounded, unequal, 2.5–6(–9) x 1–2.2(–2.8) cm, upper surfaces shiny, usually puberulent, lower ones pubescent to puberulent. Panicles 4–26 x 1.6–16 cm. Calyces densely rusty hairy outside; petals with slender, cylindrical or clavate crests. Fruits rich velvety red to orange-yellow.

From near Gladstone to Manning River, New South Wales, common form, usually in fringing forests along creek banks and in remnant rainforests.

Queensland. PORT CURTIS DISTRICT: Rodd's Bay Station via Gladstone, May 1950, *Bissett* S709; 22 km N of Rockhampton, Aug 1963, *Speck* 1706. WIDE BAY DISTRICT: 48 km SW from Bundaberg, *Bancroft* s.n. BURNETT DISTRICT: Goodnight scrub, 65 km SW of Bundaberg, Jun 1957, *Smith* 9837; Cania Gorge, May 1977, *Byrnes & Olsen* 3539. MORETON DISTRICT: Yarraman, S.F.R. 289, Feb 1972, *Moriarty* 874; North Pine River, Mar 1931, *Blake* 2358; Roberts Plateau Nat. Park, May 1929, *White* 6031. **New South Wales:** 1.6 km S of Coaldale (about 35 km NNW of Grafton), Jul 1969, *Clark, Pickard & Coveny* 1844; Duck Creek, 3 km S of Alstonville (about 13 km SW of Ballina), Nov 1965, *Constable* 6477A; Whian Whian S.F., Oct. 1966, *Jones* s.n.

forma pilosiuscula Radlk., Sitzungsber. bayer. Akad. Wiss. 9:621 (1879). **Type:** Rockingham Bay (not seen).

forma *subglabrescens* Domin, Biblioth. Bot. 89:906 (1927). **Type:** Emu Park, Rockhampton, *Domin* (not seen).

Trees 3–18 m; branchlets, petioles, rachises and peduncles usually with scattered villous hairs or glabrous; branchlets with small lenticels usually in the grooves. Leaves with petiole 15–27 cm long with 4–9 leaflets each side of rachis; petioles 1–8.5 cm; rachises 4.5–16 cm; pinnae opposite to alternate, usually narrowly and obliquely ovate-oblong, falcate, attenuate and acuminate at tips, margins serrulate or serrate or subentire, often serrulations pointed and glandular tipped, bases subacute, obtuse, unequal, 4–10.5 x 1.5–2.8 cm, glabrous or often midribs slightly villous. Inflorescences unbranched or with few short branches, axillary, rarely clustered at tips of branchlets, 7–18 x 2–6.5 cm; calyces puberulent or glabrous outside; petals pinkish with fleshy clavate crests. Fruits orange-yellow.

New Guinea and Queensland (from Cape York Peninsula to Fraser Island), in dry rain rainforests, beach scrubs and also in mangrove swamps.

New Guinea. WESTERN DISTRICT: Daru Island, Apr 1936, *Brass* 6437; Morehead River, about 13 km inland, Aug 1967, *Pullen* 7046; Lake Davimbu, Middle Fly River, Sep 1936, *Brass* 7943. **Queensland.** COOK DISTRICT: Somerset, Cape York, May 1962, *Webb & Tracey* 6120; Pin Pin (13°12'S, 145°28'E), Oct 1973, *Hyland* 2923; Bloomfield River, Nov 1902, *Poland* s.n.; S.F.R. 310 Goldsbrough L.A. (17°11'S, 145°43'E), Mar 1979, *Gray* 1360 (QRS). NORTH KENNEDY DISTRICT: Kelsey Creek, Oct 1919, *Michael* s.n.; Behind Little Ramsey Bay, Hinchinbrook Island, Sep 1975, *Sharpe* 1707. SOUTH KENNEDY DISTRICT: R. 60 Ossa, Cape Hillsborough, May 1975, *Hyland* 4274; "The Cedars", Pioneer Shire, north of Mackay, Mar 1978, *Bishop* s.n.; R573, Eungella, Finch Hatton Gorge (21°05'S, 148°38'E), May 1975, *Hyland* 426. PORT CURTIS DISTRICT: Middle Percy Island, Mar 1906, *Tryon* s.n. WIDE BAY DISTRICT: Fraser Island, Jul 1919, *Petrie* s.n.

Very variable especially in indumentum and number of leaflets, specimens from New Guinea usually having more leaflets while those from Kelsey Creek and Eungella (near Mackay) have fewer leaflets with margins nearly entire and peduncles and branchlets hairier than others. Collections from Daru and Hinchinbrook Islands are glabrous or almost so.

The small glabrous leaved specimens from Fraser Island would probably fit under *Domin's* forma *subglabrescens*.

2b. *Jagera pseudorhus* var. *integerrima* S.T. Reynolds var. nov. *J. pseudorhus* var. *pseudorhus* affinis a qua praecipue differt foliis marginibus semper integris.
Typus: Cook District: Lake Barrine, Atherton Tableland, 9 Nov 1929, C.T. White 1354 (BRI holotypus).

Trees to 18 m, usually buttressed, trunks fluted, younger parts, petioles, rachises, petiolules and peduncles densely villous; branchlets usually stout, 6 or 7-grooved towards the tip, densely pubescent with short hairs intermingled with villous hairs. Leaves with petiole 18–26 (–35) cm long with 5–10 leaflets each side of rachis; petioles 2.5–5 (–9) cm, subterete, broad, and trisulcate at base; rachises 15–18 (–26) cm, terete, bisulcate; pinnae alternate or subopposite, obliquely ovate-oblong attenuate and acuminate or acute at tips, margins entire, bases oblique obtuse, often very unequal, 3.5–7.5 (–9.5) x 1.3–3 cm, upper surfaces glabrous except the midrib, puberulent below; midrib excentric; lateral nerves 9–11 pairs often impressed above, reticulate venation indistinct above. Inflorescences usually clustered at tips of branchlets 7.5–11.5 cm long and as wide, densely flowered, peduncles ribbed. Capsules oblongoid-ellipsoid, 1.6–2 x 1–1.8 cm.

Northern Queensland, Atherton Tableland, in rainforests at altitudes 760–1130m.

COOK DISTRICT: Forest Reserves 99, Western Logging Area (54/231), Nov 1953, White s.n.; S.F.R. 185, Lake L.A. (17°09'S, 145°36'E), Sep 1968, Hyland 1950 (QRS); S.F.R. 194 (R. 263) (17°15'S, 145°25'E), Oct 1963, Hyland 481 (QRS); S.F.R. 194, Western Cpt 59, E/P36, (17°19'S, 145°26'E), Mar 1977, Unwin 237 (QRS).

Very close to var. *pseudorhus* especially the hairy form under forma *pilosiuscula* (i.e. collections from Kelsey Creek and Eungella near Mackay) but the leaflets of var. *integerrima* are always entire on the margins and reticulate venation usually indistinct above.

3. *Jagera serrata* (Roxb.) Radlk., Sap. Holl.-Ind. 10, 36 (80, 106) (1877). Based on *Sapindus serratus* Roxb., Catal. plts. . . not yet introd. 88 (1813) & Fl. Ind. ed 2 (2) :284 (1832). **Type:** ? Moluccas (not seen).

Garuga javanica Blume, Bijdr. 1165 (1825). **Type:** not known.

Jagera speciosa Blume, Rumph. 3:155 (1847), *nom. illeg.*

Garuga javanica Blume, l.c. (1847), *pro syn.*

Trees 13–20 m, buttressed; younger parts, petioles, rachises and peduncles densely dark rusty-brown velvety hairy; branchlets stout, fluted, tomentose. Leaves whorled at tips of branchlets, 35–51 cm long including petiole, with (8–)10–13 leaflets each side of rachis; petioles 3–11 cm, semiterete, broad and trisulcate at base; rachises 25–39 cm, terete; pinnae subopposite or opposite, oblong-ovate, subelliptic-oblong, subfalcate, acute or acuminate or subobtusate at tips, margins serrate or serrulate, often serrulations gland tipped; bases acute, obtuse or rounded, oblique, unequal, 6–17.5 x 2–5 cm, upper surfaces glabrous or the midribs hairy, lower ones usually puberulent; semicoriaceous; midribs often slightly excentric, lateral nerves 9–14 pairs, reticulations lax, prominent; petiolules 1–5 mm, subterete, pulvinate. Panicles usually clustered at tips of branchlets in axil of and below velutinous young leaves and bracts, 22–38 x 14.5–19 cm, much branched and copiously flowered, peduncles ribbed, cymules usually 2 or 3-flowered; bracts ovate-oblong, velutinous, 2–8 x 1–2 mm. Flowers 4.5–5.5 mm diam., yellow; pedicels 2–4 mm, pubescent; calyx lobes broadly ovate, 1.8 x 1.5 mm, pubescent outside; petals pale pink, suborbicular, shortly clawed, 2 x 2 mm, scales half as long, broad, hairy on margins, crests fleshy, clavate; stamens 8, exerted, filaments 1–3 mm, pink, pubescent, anthers obovoid, yellow; ovaries densely setose hairy. Capsules (immature) obovoid-oblongoid, to 1.2 x 1 cm.

Moluccas, New Guinea and northern Queensland, (at Oliver Creek and around Mossman). Usually at edge of rainforests.

COOK DISTRICT: Oliver Creek (16°10'S, 145°25'E), Jun 1975, *Hyland* 3179; Intake, Mossman, Sep 1948, *Smith* 3972; Little Mossman L.A. (16°30'S, 145°25'E), Jun 1973, *Irvine* 516; about 2 km SE of "The Pinnacle" about 13 km SSE of Mossman, Aug 1977, *Moriarty* 2253 (QRS).

Very close to *J. serrata* f. *serrata* (ex descr.) but leaflets are fewer; it is possibly a form quite distinct from the two forms designated by Radlkofer.

HARPULLIA

HARPULLIA Roxb., Cat. Msc. Fl. Ind. 86 (1813) & Fl. Ind. ed 1 (2) :441 (1824).

Type species: *H. cupanioides* Roxb.

Trees or shrubs, often slender and unbranched; most species stellate hairy; branchlets terete usually with numerous small lenticels, mostly hairy when young. Leaves paripinnate, with 2–5(–8) leaflets each side of rachis; rachises and petioles often with oblique wings; pinnae opposite or alternate, entire or coarsely serrulate; sessile or shortly petiolulate. Inflorescences axillary, mostly in upper axils, supra-axillary or ramiflorous, usually thyriform panicles, polygamo-andromonoecious; bracts subulate, usually as long as pedicels. Flowers regular, mostly perfumed; pedicels usually long, articulate below middle; sepals 4 or 5, free or almost free, erect, imbricate, usually subequal, persistent or deciduous; petals 4 or 5, usually longer than sepals, linear-obovate with reflexed apex, thick; or obovate and clawed or subspathulate with 2 inflexed auricles above claw, membranous; disc small, annular, mostly lobed; stamens 5–8, usually unequal, exerted, filaments and anthers glabrous; ovaries ovoid or suborbicular, laterally compressed, 2-celled with 1 or 2 ovules in each cell; styles subulate, often long and reflexed in upper half; stigmas sometimes spiral. Capsules sessile or shortly stipitate, usually 2-lobed, variable, often with very divaricate lobes, apiculate (residual style), lobes oblongoid, ellipsoid or subglobose, inflated and bladdery or somewhat compressed, loculicidally 2-valved with 1 or 2 seeds per loculus; valves thick, ± woody or crustaceous, or thin, often veined; seeds subglobose or ellipsoid, black, shiny; aril present or absent, if present nearly enveloping seed.

37 species from Indo-Malaysia, Pacific, New Guinea and Australia; eight in Australia.

1. Petioles and rachises usually winged at least in part, rarely wingless. Capsules broadly oblongoid-obovoid somewhat compressed, truncate and apiculate at apices, lobes oblongoid, not inflated, with 2 seeds in each cell; valves thickly coriaceous and wrinkled. (Usually slender shrubs 1–4 m tall) 2
 - Petioles and rachises not winged (except in some juveniles). Capsules mostly divaricately lobed, obcordate to transversely ellipsoid or suborbicular, apiculate; lobes inflated, with 1 (rarely 2) seed in each cell, valves thick or thin, not wrinkled, often finely reticulate. (Usually trees taller than 4 m) 4
2. Petioles and rachises narrowly and obliquely winged usually to below the lowermost pair of leaflets or wingless. Leaflets thickly coriaceous and shiny; petiolulate. Inflorescences usually long and slender, drooping, 5–72 cm long, with interrupted clusters of cymules 1. *H. rhyticarpa*
 - Petioles and rachises winged to the base of petiole or to about 3–15 mm away from the base, wings often broad, entire or serrate. Leaflets thinly coriaceous, sessile or subsessile. Inflorescences not as above 3
3. Wings and margins of leaflets coarsely serrulate or dentate, rarely subentire. Leaflets semicoriaceous with raised reticulation. Wings narrowing and ending in acute or subobtusate base, 3–15 mm away from base of petiole. Flowers to 8 x 8 mm. Capsules sessile 2. *H. alata*
 - Wings and margins of leaflets always entire. Leaflets thinly coriaceous, reticulations not raised. Wings usually broad throughout ending in subcordate somewhat auriculate base, near or at base of petiole. Flowers to 17 x 7 mm. Capsules shortly stipitate 3. *H. frutescens*
4. Panicles clustered on old wood, 2–4 in a cluster, slender, 6.5–9 cm long, rarely supra-axillary. (Capsules suborbicular or broadly ellipsoid with delicately veined lobes, reddish; valves thin; arillus yellow. Leaflets 4–6 pairs, 11–27(–32) x 4–8(–11.5 cm) 4. *H. ramiflora*
 - Panicles usually in upper axils, rarely clustered below leaves, 4–47 cm long. (Capsules transversely ellipsoid to obcordate; orange-yellow with reddish tint or brownish; valves thick and crustaceous or thin, then seeds not arillate; aril red. Leaflets 2–5(–8) pairs, 5.5–19(–23) x 1.8–6.5(–9) cm 5

5. Sepals persistent in fruit; seeds nearly enclosed in aril; (valves of capsules thick, crustaceous or somewhat woody). Petals oblong, thick, not auriculate. Leaves usually coriaceous 6
 Sepals deciduous; seeds without aril; (valves of capsules thick or thin). Petals spatulate shortly clawed with inflexed auricles above claw, membranous. Leaves thinly coriaceous 7
6. Leaflets elliptic or subobovate-oblong with broad usually rounded or retuse tips, rarely apices acute; coriaceous. Inflorescences dark brown velvety tomentose, clustered in upper axils. Capsules subsessile (stipes to 1 mm long) with 2 divaricate lobes; valves subwoody, pubescent inside 5. *H. hillii*
 Leaflets elliptic-ovate, usually narrowing towards apex with acute or bluntly acuminate tips; thinly coriaceous. Inflorescences solitary, supra-axillary, peduncles finely puberulent. Capsules stipitate (stipes 2–3 mm long), lobes not divaricate, slightly compressed at sutures; valves somewhat crustaceous, or rigid, glabrous inside 6. *H. thanatophora*
7. Capsules on stipes 1–4 mm long, valves thin, delicately but not transversely veined. Flowers 6–12 x 5–12 mm; pedicels 5–10 mm; stamens 7–8; disc glabrous. Leaflets 4–6 (–13), 5.5–10.5 (–16) x 1.8–4 (–7) cm, bases narrow, obtuse, oblique. Branchlets with pale hairs 7. *H. pendula*
 Capsules on stipes 4–6 mm long, valves crustaceous, transversely veined. Flowers 1–1.6 x 1–1.4 cm; pedicels 1–5 cm; stamens 5; disc rusty hairy. Leaflets 6–9, 10–19 (–23) x 4–6.5 (–9) cm, bases obtuse, oblique, or subtruncate and usually unequal. Branchlets rusty velvety hairy 8. *H. arborea*

1. **Harpullia rhyticarpa** C.T. White & Francis, Qd. Dept. Agric. Bot. Bull. 22 : 10 (1920); C.T. White, Contr. Arn. Arb. 41 : 64 (1933). **Type:** Cook District: Bernard's spur, Bellenden Ker Range, *F.M. Bailey* s.n. (BRI holo).
Harpullia angustialata C.T. White & Francis l.c. : 12 (1920). **Type:** Cook District: Yarrabah, *Rev. N. Michael* s.n. (BRI holo).

Small slender trees 2–6 m, often unbranched; younger parts ferruginous pubescent; branchlets rounded, slightly striated, glabrous with few small reddish brown lenticels. Leaves with petiole (7–)18–31 (–44) cm, with 4–5 (–8) leaflets each side of rachis; rachises and often part of petiole narrowly winged or margined with entire wings which usually tapers and ends just below the lowermost pair of leaflets, or rachises wingless often zigzag; petioles 4.5–10 (–13) cm, terete, pulvinate, sometimes winged at apex, glabrous; rachises (5–)11.5–18.5 (–38) cm, terete, adaxially ridged; wings between each set of leaflets oblique, unequal, wider below insertion of leaflet and tapering to next set of leaflets; pinnae opposite or alternate, elliptic-ovate-oblong or subovate-oblong with cuneate base or elliptic-ovate, usually narrow at both ends, tips abruptly and obtusely acuminate, caudate or acute, margins entire, bases acute or narrow and subtruncate with adjacent part of lamina upturned and hiding midrib at base, 3.2–17 (–29) x 1.3–5.5 (–8.2) cm, glabrous or subglabrous, dark glossy green and shiny, discolorous, thickly coriaceous with prominent nerves, lateral nerves 10–18 pairs, arcuate, usually ascending at tips; reticulation prominent especially below; petiolules 2–4 mm, thick, pulvinate. Inflorescences in upper axils, usually 1–5 per axil, 5–72 x 1–3 cm, usually long and slender and pendulous with golden brown tomentose peduncles bearing interrupted clusters of 3–17 flowered cymes; bracts subulate. Flowers whitish, fragrant, 13–15 x 8–13 mm; pedicels to 7 mm, tomentose; sepals oblong-ovate, obtuse, 8–10 x 6 mm, yellow with pale margins, tomentose; petals white, obovate-cuneate, with reflexed tip, 12–14 x 3–5 mm, glabrous; disc sinuate lobed, pubescent; stamens 5 or 6, filaments slender, to 6 mm long, anthers apiculate, 3.5 mm long; ovaries villous. Capsules shortly stipitate, orange-yellow with rosy-pink flush or pinkish flush; broadly obovoid-oblongoid, apiculate, 1.4–2.5 x 2.5–4 cm, (grooved in the middle with lobes oblongoid) broader at apex, slightly compressed; valves coriaceous, drying wrinkled, pubescent outside and puberulent and deep pink inside; seeds usually 2 in each cell, shiny, blackish with cupular yellow aril nearly enclosing it; sepals persistent; stipes 2–3 mm long.

Northern Queensland, especially common around Atherton Tableland; in rainforests in hilly and mountainous country and lowland ridges, usually on granite.

COOK DISTRICT: Upper Parrot Creek, Annan River, Sep 1948, *Brass* 20172; Bloomfield near Hopevale, Sep 1960, *Smith* 11103; near Noah Creek (16°10'S, 145°10'E), Apr 1972, *Hyland* 5977; Cape Tribulation, Jul 1976, *Jacks* s.n.; Mt Spurgeon, Sep 1936, *White* 10547; Mt Misery on Mt Carbine Tableland, Sep 1972, *Webb & Tracey* 10824; Mossman, Aug 1948, *Smith* 3941; Mt Lewis, Nov 1976, *Moriarty* 2169; Saddle Mt, near Kuranda, Apr 1967, *Winkel* s.n.; Davies Creek, Mareeba District, May 1962, *McKee* 9462; Yungaburra near Lake Barrine, June 1932, *Blake* 9595; NORTH KENNEDY DISTRICT: Kirrama Range, Aug 1955, *Volck* 1103.

A very variable species in leaves and length of inflorescence but easily distinguished by its very coriaceous and shiny discoloured leaves with prominent nerves; rachises if winged never extending far from basal pair of leaflets and very long slender pendulous inflorescences.

2. *Harpullia alata* F. Muell., *Fragm.* 2 : 103 (1860); Benth., *Fl. Aust.* 1 : 470 (1863); F.M. Bailey, *Qd. Fl.* 1 : 308 (1899); R.H. Anders., *The trees of N.S.W.*, 257 (1957); Francis, *Aust. Rain-For. trees*, ed 3 : 261 (1970). **Type:** Clarence River, N.S.W., *Dr. Beckler* (Not seen).

Misapplied name: *Harpullia frutescens* C.T. White, *Qd. Nat.* 1, *Bot. Notes* 1 : 204 (1911), from McPherson Range.

Tall straggly slender shrubs or small trees 1-7 m, usually few branched; young parts ferruginous tomentose; branchlets glabrous, with small raised lenticels. Leaves clustered at tips of branchlets, 12-33(-42) cm long including petiole, with 3-6 leaflets each side of rachis; rachises and petioles broadly winged with oblique, reticulate, denticulate mucronate, repand or rarely subentire wings; petioles 6-10.5 cm, terete, pulvinate, the wings usually tapering and ending in acute or subacute base 3-15 mm away from base of petiole (juvenile leaves sometimes winged to the base of petiole), solitary gland often present near base of petiole, glabrous; rachises (8.5-) 11-18(-23) cm, terete, wings between each set of leaflets usually wider at apex, narrowing to base, glabrous; pinnae sessile or subsessile, opposite or subopposite, elliptic or elliptic-obovate abruptly acuminate at tips; margins like the wings on rachis and petiole usually irregularly and coarsely serrulate or repand dentate, rarely subentire; bases cuneate, obtuse or subacute and decurrent, oblique, or subtruncate, 6-18 x 2.5-7 cm, lowermost pair the smallest, glabrous, rarely puberulent, shiny, dark green, semicoriaceous, lateral nerves 8-16 pairs, subpatent, reticulate venation forming dense network, areoles minute, prominent, raised below; petiolules if present 1-3 mm, thick, glabrous. Inflorescences axillary, slender, few flowered racemes, 5-14 cm long, (females shorter than males), peduncles puberulent, lenticellate. Flowers white, 8 x 8 mm; pedicels to 1.3 cm long; sepals ovate, obtuse, 7 x 5 mm, puberulent outside, pubescent inside; petals linear or subobovate-oblong to 12 x 3 mm, glabrous; discs rusty hairy; stamens 8, filaments slender, glabrous; ovaries 2-lobed, pubescent, style flat, sometimes reflexed. Capsules sessile, yellowish, broadly obovoid, 1.8-2.4 x 2.8-3.8 cm, lobes obliquely oblongoid, often wider at apex, turgid, slightly compressed at margins; valves coriaceous, wrinkled, minutely hairy outside, glabrescent to puberulent inside; seeds 2 in each cell, shiny, chestnut-brown, nearly enveloped by yellow to reddish aril; sepals persistent.

Southern Queensland and northern New South Wales, from McPherson Range, where it is quite common, to Clarence River, usually at high altitudes in gullies and steep slopes.

Queensland. MORETON DISTRICT: Upper Nerang River, May 1977, *Byrnes* 3512; Ships Stern track, Lamington National Park, Apr 1976, *McDonald & Clarkson* s.n.; Beechmont, Sep 1929, *White* 6198. **New South Wales.** Geelong L.A., Whian Whian S.F. near Lismore (28°35'S, 153°20'E), Aug 1975, *Moriarty* 1688.

Very close to *H. frutescens* which differs in having entire leaflets and wings of rachis extending to base of petiole and ending in subcordate base. Flowers also larger.

3. *Harpullia frutescens* F.M. Bailey, Rept. Bellenden Ker Expd. 15 (1889), Qd. Fl. 1: 308 (1899). **Type:** Cook District: Bellenden Ker, (alt. over 2,000 ft) *F.M. Bailey* s.n. (BRI holo).

Misapplied name: *H. alata* F. Muell., Fragm. 9: 89 (1875) — from Rockingham Bay.

H. marginata Radlk., Engl. & Prantl, Nat. Pflanzenfam. 3 (5): 362 (1895). **Type:** not seen, probably from Cairns.

H. holoptera Radlk., Fedde Report. 20: 40 (1924). **Type:** Cook District: Mulgrave, 1907, *Diels* 830 a & b (not seen).

Tall shrubs or small trees to 1 m, slender, unbranched; branchlets rounded, somewhat warty, lenticellate, pubescent or puberulent. Leaves with petiole 18–38 cm, with 3–4(–5) leaflets each side of rachis; rachises and petioles broadly winged to the base of petiole; petioles 3.5–8.5(–10) cm, the broad wing ending at broad pulvinus in a subcordate or auriculate base, glabrous or puberulent; rachises 4.5–18.5 cm, terete, glabrous above, puberulent below; wings broad, entire, reticulate, often slightly wider at apex between each pair of leaflets and oblique; pinnae sessile, rarely subsessile, subopposite or alternate, elliptic or elliptic-oblong, often slightly wider above middle, usually narrow at both ends, tips abruptly acuminate or caudate, margins entire, repand, bases narrowly subcordate or truncate, 7.5–17(–19) x 2.3–5(–7) cm, dark green, shiny, glabrous or midribs puberulent above, puberulent or glabrous below, the midribs usually pubescent or puberulent, thinly coriaceous; lateral nerves 9–11 pairs, fine, \pm arcuate, reticulate venation fine; petiolules to 1 mm, pulvinate. Inflorescences mostly in upper axils, often 2–4 in a cluster, 3–12 cm long and about half as wide, few branched, laxly flowered; peduncles slender, densely pale rusty hairy or puberulent. Flowers 1.7–2 x 0.7 cm, white with pink tinge, fragrant; pedicels to 5 mm, puberulent with scattered large rusty stellate hairs; sepals 4 or 5, obovate-oblong, 7–8 x 3 mm, reddish-brown, paler at margins, pubescent; petals 4, obovate-oblong, cream, 15–20 x 3.5 mm, reflexed at apex, glabrous; disc 5(or 6)–lobed, finely puberulent; ovaries 2–lobed, tomentose, style thick, recurved. Capsules shortly stipitate, crimson, broadly oblongoid-obovoid, broader than long, 1.2–1.6 x 1.8–2.2 cm, lobes irregularly oblongoid, slightly compressed; valves coriaceous, wrinkled when dry, puberulent or pubescent outside, glabrous inside; seeds 2 per cell, enclosed in cupular yellow aril; sepals persistent; stipes 1–2 mm long.

Northern Queensland, from Ayton to Atherton Tableland area where it is quite common in rainforests, usually in hilly country.

Queensland. COOK DISTRICT: Ayton, Jul 1962, *Gittins* P 576; Mt. Bartle Frere, Jan 1935, *Flecker* s.n.; S.F.R. 185, Downfall L.A. (17°10'S, 145°36'E), *Unwin* 9 (QRS); Juara Creek, Danbulla, Aug 1948, *Smith* 3740. NORTH KENNEDY DISTRICT: Herberton, *Bancroft* s.n.; Evelyn, in 1899, *Bailey* s.n.

4. *Harpullia ramiflora* Radlk., Sapin. Holl.-Ind. 54 (126) (1877); Engl. & Prantl, Nat. Pflanzenfam. 3(5):362 (1895). **Type:** New Guinea (not seen).

Slender small trees 3–9 m, sparsely branched; branchlets glabrous, pale, with numerous small brown lenticels. Leaves with petiole 30–45(–70) cm, with 4–6 leaflets each side of rachis; petioles 3.5–9.5(–19) cm, terete, pulvinate, glabrous; rachises 23–27(–44) cm, terete, wingless, glabrous; pinnae alternate, oblong-ovate-elliptic or elliptic-oblong, acute or acute-acuminate at apices, margins entire, bases acute or obtuse, 11–27(–32) x 4–8(–11.5) cm, dark green, glabrous, semi-coriaceous, lateral nerves 12–18 pairs, arcuate, ascending at tips, usually slightly impressed above; petiolules terete, grooved above, 3–8 mm. Inflorescences usually ramiflorous and clustered with 2–4 per cluster, or supra-axillary, 6.5–20 x 1–11 cm, few branched and laxly flowered, peduncles ribbed, slender, minutely rusty pubescent or puberulent. Flowers white, 1–1.3 x 0.6–1 cm, fragrant; pedicels 5–8 mm, articulate below middle, pubescent; sepals 5, oblong-elliptic or obovate, slightly con-

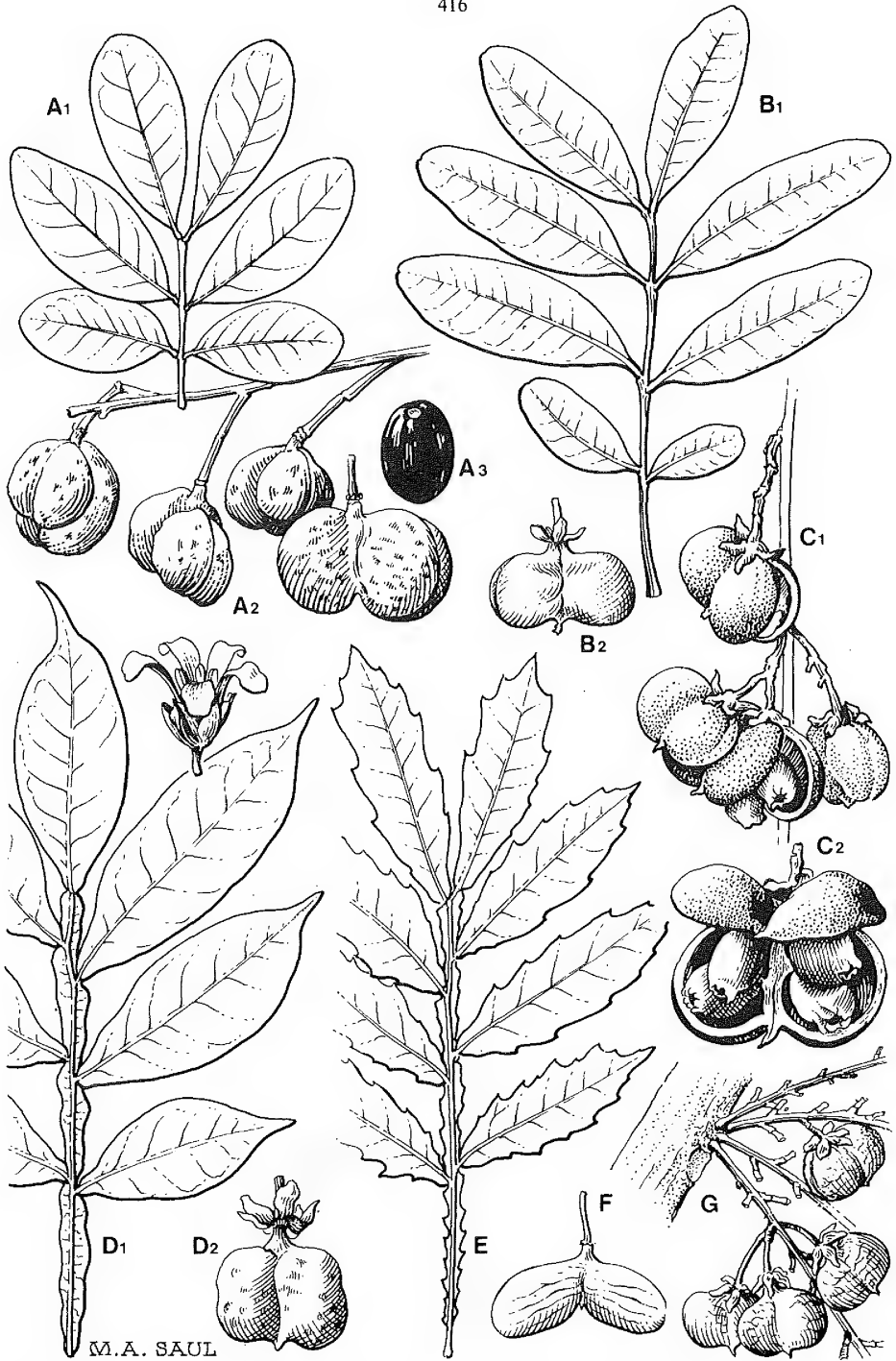


Figure 29. *Harpullia*. A. *H. pendula*. A1. Leaf (x 1/3). A2. Fruit (x 1). A3. Seed (x 1). B. *H. hillii*. B1. Leaf (x 1/3). B2. Fruit (x 2/3). C. *H. rhyticarpa*. C1. Fruits. C2. Fruit (x 1). D. *H. frutescens*. D1. Leaf (x 1/3). D2. Fruit (x 1). E. *H. alata*, leaf (x 1/3). F. *H. arborea*, fruit (x 2/3). G. *H. ramiflora*, fruits (x 2/3).

cave, 6–7.5 x 3–4 mm, pubescent; petals 4, twice as long as calyx, narrowly obovate oblong, reflexed at apex, 9.5–13 x 3–4 mm, glabrous, thick, veined; disc sinuate-lobed, pubescent; stamens 5, usually unequal, filaments \pm subulate, 2.5–6.5 mm, glabrous (in females to 2.5 mm long), anthers ovoid-oblong, 3 x 1.2 mm; ovaries tomentose. Capsules shortly stipitate, reddish, suborbicular to transversely broad ellipsoid with 2 suborbicular to \pm ellipsoid inflated lobes, 1.2–1.8 x 1.8–2.2 cm, slightly compressed at junction of valves; valves thin, delicately veined, puberulent outside, glabrous inside; seeds solitary in each cell, black, enclosed in yellow aril; sepals persistent; stipe to 2 mm long.

New Guinea to northern Queensland, common in riverine rainforests or at edge of rainforests; probably widespread in New Guinea. Only so far recorded from Iron Range in Queensland, this being a new record of the species for Australia.

New Guinea. From Fly River to Milne Bay District, between 8°–10°S lat. and 143°–150°E long. Northern District: Wanigela (10°05'S, 148°10'E), Aug 1965, *Buderia* s.n. (NGF 20776); Palmer River, 3 km below junction Black River, Jul 1963, *Brass* 7246. **Queensland.** COOK DISTRICT: Rocky River Catchment, Sep 1973, *Hyland* 2851; Claudie River, Iron Range, Jul 1978, *De Baar* s.n.

5. *Harpullia hillii* F. Muell., Trans. Philos. Inst. Vict. 3:26 (1859), & Fragm. 2:104 (1860); Benth., Fl. Aust. 1:470 (1863); F.M. Bailey, Qd Fl. 1:308 (1899); R.H. Anders., Trees of N.S.W., 257 (1957); Francis, Aust. Rain-For. trees, ed 3:261 (1970). **Type:** Durando, *W. Hill* (not seen).

Trees 6–20 m; young parts puberulent; branchlets striated, often pale with numerous small elliptic lenticels and scattered rusty red stellate hairs; peduncles and flowers with dark brown rusty velvety stellate tomentum. Leaves with petiole 13–35(–70) cm, with (1–)3–5(–8) leaflets each side of rachis; petioles 3.5–8(–10.5) cm, terete, pulvinate, glabrous, often lenticellate; rachises (3.5–) 5.5–12(–19) cm, terete, wingless (some juvenile leaves often obliquely winged), glabrous, often lenticellate; pinnae alternate or subopposite, elliptic-oblong or subobovate, apices rounded, obtuse, retuse, margins entire, bases subacute or obtuse, often oblique and subequal, 5.5–16(–23) x 2.5–5.3(–7.2) cm, lowermost pair the smallest, glabrous, coriaceous, discolorous, shiny above; lateral nerves 9–18 pairs, arcuate and looping at margins; petiolules 3–6 mm, semiterete. Thyrsiform panicles in upper axils, copiously flowered, 14–30 x 5–22 cm; bracts subulate, to 6 mm long. Flowers 0.8–1 x 1.2 cm; pedicels to 4 mm; sepals obovate-elliptic, 6–8 x 4–6 mm, velvety outside with yellowish hairs, tomentose inside; petals oblong, obtuse at reflexed apex, 8–12 x 4 mm, white, glabrous; disc minute, pubescent; stamens 5, usually unequal, filaments 4–5 mm long, anthers minutely apiculate, 3 mm long. Capsules shortly stipitate, yellowish, transversely ellipsoid to depressed obovoid; attenuate at base, or subobcordate, with divaricate, inflated, subglobose to ellipsoid lobes, 1.3–1.5 x 2.7–3.5 cm, valves subwoody, veined, pubescent or puberulent outside, densely long hairy inside; seeds mostly solitary, black, enclosed in red aril; sepals persistent.

Chiefly coastal from Burdekin River, Queensland, to Clarence River, New South Wales, usually in dry rainforests on hillsides.

Queensland. NORTH KENNEDY DISTRICT: Clare-Burdekin Levee, Jun 1949, *Smith* 4408 & 4409; Cannonvale area, 1976, *Wynne* s.n., SOUTH KENNEDY DISTRICT: Mackay, Nov 1889, *Griffith* s.n. PORT CURTIS DISTRICT: Rockhampton, *Bzerley* s.n.; S of Round Hill Head on inland side of Peninsula, Mar 1970, *Everist* s.n. WIDE BAY DISTRICT: Bingera, Oct 1948, *Smith* 4121; Dundowran, Sep 1965, *Gittins* 1134. BURNETT DISTRICT: Mt Perry, *Keys* s.n. MORETON DISTRICT: Yarraman, May 1925, *Cameron* s.n.; D'Aguiar Range NW of Brisbane, Aug 1972, *Moriarty* 965; South Pine, *Hill* s.n.; Green Island, Moreton Bay, Nov 1914, *White* s.n.; Hotham Creek, on way to Beechmont, Dec 1952, *Smith* 5140; 3 km S of Canungra, Nov 1970, *Williams* s.n. **New South Wales.** Recorded from Whian Whian S.F. to Kangaroo River S.F.

Tips of leaflets vary, the southern ones usually with rounded retuse tips while some northern ones have abruptly acuminate or acute apices.

6. *Harpullia thanatophora* Blume, Rumph. 3: (1847). **Type:** New Guinea (not seen).

H. leichhardtii F. Muell. ex Benth., Fl. Aust. 1:470 (1863); Radlk., Sap. Holl.-Ind. 52 (122) (1877). **Type:** Port Essington, *Leichhardt* (not seen).

Trees; young parts and peduncles puberulent, branchlets with small lenticels. Leaves with petiole 12–30 cm, with 2–3 leaflets each side of rachis; petioles 3–7 cm, terete, pulvinate; rachises 9.5–11.5 cm, terete, wingless; pinnae alternate, variable, elliptic-ovate to elliptic-oblong, oblique, usually attenuate at tips, acute or obtusely acuminate or obtuse, margins entire, bases rounded or obtuse, subequal, oblique, glabrous or lower surfaces glabrescent, shiny above, thinly coriaceous; lateral nerves 7–12 pairs, suboblique, slender, reticulations lax, fine; petiolules 3–10 mm, grooved above. Inflorescences solitary, supra-axillary, 6–14 cm long, laxly branched. Flowers not seen; persistent sepals elliptic, to 5 x 2.5 mm, tomentose. Capsules stipitate, broadly subobcordate or to broadly transversely ellipsoid, with \pm suborbicular, inflated lobes, slightly compressed at margins, 1.4–2.2 x 2.5–4.2 cm, valves thick, somewhat crustaceous, puberulent outside, glabrous inside; seeds solitary, ellipsoid, covered by aril; stipe 2–3 mm long.

New Guinea and northern Australia, in rainforests.

Northern Territory. Yirrkala Mission, Jan 1974, *Scarlet* s.n.

7. *Harpullia pendula* Planchon ex F. Muell., Trans. Philos. Inst. Vict. 3:26 (1859), Fragm. 2:104 (1950); Benth., Fl. Aust. 1:471 (1863); F.M. Bailey, Qd Fl. 1:309 (1899); R.H. Anders., Trees of N.S.W., 256 (1957); Francis, Aust. Rain-For. trees, ed 3:261 (1970). **Type:** Forests near Moreton Bay (not seen).

Trees 10–15 m high and to 50 cm girth; buttressed; younger parts and peduncles with scattered pale brown, fine appressed stellate hairs; branchlets pale with small ellipsoid lenticels. Leaves with petioles 11.5–28 cm long with 2 or 3(–7) leaflets each side of rachis; petioles 2.2–5.5(–10) cm, subterete, pulvinate; rachises 1.5–6(–9) cm, terete, adaxially ridged, wingless; pinnae alternate, elliptic-oblong or subobovate-oblong, apices acuminate or obtuse, margins entire, bases subacute or obtuse, oblique, 5.5–10.5(–16) x 1.8–4(–7) cm, pale green, glabrous or puberulent especially on midribs below, semicoriaceous; lateral nerves 6–12 pairs, reticulate venation lax; petiolules 3–6 mm, slender, adaxially ridged, glabrescent or glabrous. Thyrsiform panicles supra-axillary, narrow, laxly branched and flowered, 3–28 cm long, cymules 2 or 3 flowered. Flowers 6–12 x 5–12 mm, greenish-yellow, faintly perfumed; pedicels 5–10 mm, pubescent; sepals oblong or suborbicular, concave, 4–5 x 3–3.5 mm, pubescent or puberulent, deciduous; petals obovate with auriculate short claw, 7–8 x 3 mm, pubescent inside (towards base), puberulent outside; disc crenulate, glabrous; stamens 7 or 8, filaments 6 mm long, subulate; ovaries tomentose, style stout to 1 cm long, twisted or sigmoid at apex. Capsules very shortly stipitate to nearly sessile, reddish ripening yellow-orange with red flush, transversely ellipsoid with very divaricate, subglobose, bladderly lobes, 1.3–2.4 x 2.6–3.8 cm, valves thin, delicately veined, subglabrous outside, glabrous inside; seeds mostly solitary, subglobose, shiny, black, exarillate; stipes, 1–3 mm long, puberulent.

Coastal from Black Mt near Helenvale, northern Queensland to Bellinger River, New South Wales; usually along creek banks in dry or cleared rainforests on basalt.

Queensland. COOK DISTRICT: Black Mountain (15°31'S, 145°14'E), Aug 1959, *Smith* 10717A; Roadside Mulgrave River approx N of crossing, May 1971, *O'Farrell* s.n. NORTH KENNEDY DISTRICT: Koolmoon Creek 16 km SSE of Ravenshoe, Sep 1950, *Smith* 4725; Stuart Creek, S of Townsville, Aug 1942, *Smith* 4102. SOUTH KENNEDY DISTRICT: Mackay, Nov 1897, *Nugent* s.n. PORT CURTIS DISTRICT: 10 km SW of Tynan Homestead, June 1963, *Lazarides* 6890; Baffle Creek District, Apr 1920, *White* s.n. WIDE BAY DISTRICT: Dundowran via Nikenbah, Jul 1928, *Tryon* s.n.; Imbil, Nov 1917, *Epps* s.n. BURNETT DISTRICT: Mt. Perry, *Keys* s.n. MORETON DISTRICT: Brookfield, Brisbane, Jul 1971, *Moriarty* 749; 3 km S of Canungra, Nov 1970, *Williams* s.n.; Burleigh Heads, May 1977, *Byrnes* 3519. **New South Wales.** Recorded from Tweed Heads to Bellinger River: 19 km from Woodenbong on Stanthorpe Rd, Nov 1946, *Everist & Webb* 1394; Tweed Heads, Jan 1914, *Boorman* s.n.

Common Name: "Tulipwood" or "Tulip Lancewood".

Uses: Timber used for cabinet making, penholders, walking sticks. Also cultivated as an ornamental tree.

8. *Harpullia arborea* (Blanco) Radlk., Sitzungsber. bayer. Akad. 16:404 (1886); Engl. & Prantl, Nat. Pflanzenfam. 3(5):362 (1895). Based on *Ptelea arborea* Blanco, Fl. Filip. 63 (1837). **Type:** not seen.

Blancoa arborea Blume, Rumph. 3:181 (1847). Based on *Ptelea arborea* Blanco.

Otonychnium imbricatum Blume l.c. 180 (1847). **Type** : not seen (? from Ceylon).

H. imbricata Thw., Enum. Pl. Zey. 56 (1859). Based on *Otonychnium imbricatum* Blume.

H. blancoi F.—Villar, Blanco, Fl. Filip. ed 3:4 (1880). Based on *Ptelea arborea* Blanco.

Trees 10–20 m tall and 6–20 cm girth; young parts dark rusty velvety tomentose; branchlets pale with numerous small lenticels, pubescent to glabrescent. Leaves with petiole 15–37 (–53) cm with 3–5 leaflets each side of rachis; petioles 4–9 (–12.5) cm, broad at base, glabrescent or pubescent especially towards the base; rachises 4–22 (–34) cm, terete, pubescent or glabrescent; pinnae alternate or subopposite, elliptic-oblong or elliptic-subobovate, apices acute, acuminate, often abruptly acuminate or obtuse, margins entire; bases oblique, obtuse and usually unequal, 10–19 (–27) x 4–6.5 (–10) cm, glabrous or puberulent on the midrib and nerves below, semicoriaceous; petiolules 4–6 mm, dark rusty tomentose. Inflorescences in upper axils or ramiflorous and clustered on short lateral branches, usually 2 or 3 in a cluster, laxly branched and flowered, males 4–22 cm long, females 15–47 cm long, peduncles rusty pubescent or puberulent with large stellate hairs, cymules 2 or 3 flowered. Flowers 1–1.6 x 1–1.4 cm, greenish white or yellowish, females larger and on longer stalks; pedicels 1–5 cm long, filiform, usually drooping, pubescent with large stellate hairs; sepals obovate-elliptic, 6–7 x 3.5–4 mm, outer pair smaller, membranous, pale, deciduous, pubescent, hairs shorter inside; petals spatulate, clawed with inflexed auricles above claw, 12–14 x 4.5 mm, glabrous except finely puberulent claw; disc rusty hairy; stamens 5, filaments filiform, 1.3 cm long, conduplicate in bud, anthers 3 mm long; ovaries stipitate, elliptic, densely rusty hairy, style 1 cm long, twisted at apex, pubescent towards base. Capsules stipitate, orange-red or orange-yellow with pink flush, broadly obcordate, deeply 2-lobed especially at apex, 1.5–2.3 x 2.8–5 cm, lobes subglobose, inflated, compressed and carinate at sutures; valves thick crustaceous, transversely nerved, puberulent outside, glabrous inside; seed usually solitary in each cell, shiny, black, exarillate; stipes 4–6 mm long, rusty tomentose.

India, Malaysia, Solomon Islands, Phillipines, Indonesia, New Guinea and northern Queensland. In rainforests usually in hilly country.

New Guinea. NEW BRITAIN: E of Airgilpua, Talasea, Nov 1965, *Frodin* s.n. (NGF 26274.). GULF DISTRICT: SW margin of junction of Kapua & Tauri rivers, Mar 1966, *Schodde & Craven* 4641. MOROBE DISTRICT: Bulolo, Sep 1962, *Havels* s.n. (NGF 15424.). **Queensland.** COOK DISTRICT: V.C.L. Noah on Cape Tribulation Rd., near Noah head (16°10'S 145°10'E), Apr 1972, *Hyland* 5968.

Only once collected from Queensland, the specimen being in fruit. This is a new record of the species for Australia.

Imperfectly known species

- 1. *Harpullia holoptera*** Radlk., Fedde Repert. 20:40 (1924). **Type:** Mulgrave River, *Diels* (not seen). It is probably the same as *H. frutescens* and retained as such under *H. frutescens* until type material becomes available.
- 2. *Harpullia divaricata*** Radlk., Sitzungsber. bayer. Akad. 20:279 (1890) **Type:** ? Bloomfield River, *E. Bauer* (not seen). No specimens in herbarium under this name, probably the same as *H. arborea* (Blanco) Radlk. as far as description goes.